OF, BY, AND FOR THE PEOPLE? HOW DEMOGRAPHIC PRESSURE AFFECTS PARTICIPATION IN INTER- AND INTRA-STATE CONFLICTS

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Under what circumstances do demographic factors motivate states to engage in inter-state conflict, and when do these factors lead to civil conflict? IR and comparative politics scholars have investigated the links between population and conflict, but two common limitations are common in such studies. First, scholars have failed to differentiate between the demographic causes of inter-state (between countries) and civil conflict, as these conflict processes are not often addressed in the same study. Second, scholars have failed to define and explain adequately the difference between demographic *change* and demographic *pressure*.

This project addresses these two limitations in the current research. First, I propose a second-image explanation of conflict which rests on the contractual relationship between the state and society. As the state collects rents from society to provide services, so society expects services for rents paid. When this relationship is disrupted by demographic pressure, states must respond to forestall regime change or state breakdown. If the state cannot extract rents internally, they may pursue external options to acquire additional resources. Failure to attain resources may result in internal conflict as domestic groups simultaneously evaluate the effectiveness of the government in meeting societal demands.

The second limitation this project addresses is the conceptual imprecision of 'demographic pressure'. I distinguish between demographic *change* and demographic *pressure* by accounting for state capacity. All states experience demographic change, but many states

have the capacity to adapt to these changes. States experiencing economic hardship, however, face 'pressure' when demographic changes cannot be accommodated easily with existing economic stagnation.

I utilize two large cross-national datasets, covering the post-World War II period to test my theoretical link between demographic pressure and inter-state and civil conflict while controlling for state, dyadic and systemic factors. The empirical analysis supports my primary hypotheses that demographic pressure is associated with an increased likelihood of both inter- and intra-state conflict. Additional hypotheses to determine more specific conditions under which this increased likelihood holds generated mixed results; however, the robustness of the demographic pressure measure confirms that demographic pressure is an important predictor of both civil and inter-state conflict.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREFACE

In any large undertaking, one accumulates many debts, and the creation of this dissertation is no exception. In my case my debts are quite heavy, for without those kind and generous souls listed below (and those my very fallible memory has neglected to note), I would not be preparing to embark on an academic career. It is unclear what would have unfolded along the path not taken, but my excitement regarding the path I'm on is sufficient for me to believe that the support and encouragement I've received over the past six years has pushed me along the right path. Though it will be impossible to pay these debts in full, I hope the completion of this project will validate those who believed in me from the beginning, especially when I struggled to believe in myself.

My greatest academic debt belongs to my dissertation chair, David H. Bearce, whose well-timed pep talks always kept me moving forward when I was sorely tempted to quit the race. As an advisor, co-author and friend, David has walked every step of this journey with me, even when I was 'off the leash' and did not know it, and my gratitude for his instruction and support is boundless.

Guiding me through the dissertation was too great a task for just one person, and the remaining members of my committee, Charles S. Gochman, Burcu Savun and Siddharth Chandra, rose to the occasion admirably. Whether by challenging me to broaden my thinking and improve my writing or in spending numerous hours listening to the work-in-progress that

became my job talk, these advisors gave me the tools to present my work confidently and the support to fail spectacularly, pick myself up, and get the job done.

For the past six years, the Department of Political Science at the University of Pittsburgh has been my home, and many of the people there have challenged, inspired, and/or comforted me at various points in the process. Among the excellent faculty there, Michael Goodhart, Chris Bonneau and Jon Hurwitz have been almost constant sources of inspiration and motivation. With no real stake in my professional success, they were at times the most believable sources of criticism and praise. Without them, my journey would have been unbearably tortured.

Among my graduate student colleagues, the lion's share of gratitude is reserved for the fearless members of Histogramectomy, especially the surviving members: Kristen Flanagan, Luis Jimenez, Andrew Lotz, Zeki Sarigil, and Matt Weinstein. Words cannot express how these friends have helped me, and I hope to return the favor some day.

Many other graduate students have contributed to a positive working environment and much needed stress relief. I would particularly like to single out Heather Elko McKibben whose Tuesday lunches became one of the brightest spots in my week. I am distressed that we will not be able to eat Greek/Mediterranean salads together once a week during the coming years, but I am confident that our friendship will be sustained (even without warm pita).

The final group of people at the University of Pittsburgh deserving of special mention are the members of the University's Dissertation Support Group, a collection of brilliant academics-in-training, and their leader, Joellen Popma, a very wise woman. The skills, tools and motivation that I gained from them pushed me across the finish line. I am deeply in their debt.

My professional development was enhanced over the years by my participation as a teaching assistant for Timothy McDaniel and Genie Baker at the ICPSR Summer Program in

Ann Arbor, MI. My thanks to them are profound for modeling excellent teaching and dedication to their students. My interactions with such scholars as Jeff Gill and Brad Jones while participating in the program improved my dissertation in many subtle ways. My friendship with Leslie Johns, which was formed through several shared summers in Michigan, also proved critical in helping me through the job market process as well as the final months of writing the dissertation. Additional professional development occurred at the Journeys in World Politics conference at the University of Iowa, and I am grateful to organizers Sara Mitchell and Kelly Kadera for introducing me to a phenomenal group of women to whom I hope to be connected for many years to come.

Additional thanks belong to various friends outside of the political science community who provided love and support throughout the years. The Coblentz Gang from Hood College has always encouraged me to challenge, improve and love myself, and I greatly appreciate their friendship more than 10 years after our graduation. Susan Y. Ortiz has been the truest of friends for the past eight years, and her constant words of encouragement and the time we have spent together have meant more to me than any professional achievement I've accomplished to date. Now that her own dissertation process has begun, I hope I can provide even half of the support she's provided to me.

Finally, I would like to thank my parents, William and Carol Floros, for instilling in me a love of learning; my uncle, Chris Floros, for keeping me warm and well-informed; my aunt, Rosanne Fisher, for a link to the past; my sister, Nikki Matusiak, for forgiving me for being a bratty little sister and treating me like an adult; and my brother Matt Floros, for setting the example and going first.

I dedicate this dissertation to the next generation: Helena, Aleksander, Cecilia, and Dimitri Matusiak and Athena, Ardon, and Alanna Floros. May they be inspired by the successes of their elders and gain the wisdom needed to fix our mistakes. All of my love goes to them.

1.0 INTRODUCTION

Under what conditions does demographic pressure lead to internal conflict against a state? Under what conditions does demographic pressure lead states to engage in external military conflicts with other states? Demographic factors such as population growth, population density, migration, youth 'bulges', and other related factors can be viewed as both constraints on a population and as engines for change. For some states, these factors are expected to promote economic growth and shore up the welfare state. For other states, however, such factors may stress the state's ability to provide goods and services for the changing population. This results because states vary in their capacity to adapt to such factors, leading to varied responses to demographic pressure. Some states are able to respond to these pressures internally with no violent or repressive action resulting from demographic pressure. The grievances which arise from shortfalls in service provision may be accommodated peacefully through the political process, or governments are able to prevent the onset of grievances by obtaining needed resources through borrowing, deficit spending, or adopting belt-tightening measures that allow the government to continue to provide benefits to their populations. Other states, meanwhile, are unable to meet increasing demands by the population. If states fail to accommodate domestic demands in the face of demographic pressure, they face the consequences of that failure.

Domestic groups evaluate the efficacy of their leaders, and rising grievances may prompt them to withdraw their support from the government. Such disaffected groups may seek to

replace the government leaders with those who promise to address their grievances, or they may attempt to break some territory away from the state and establish a new state. Government leaders, regardless of regime type, strive to remain in power, and thus, pursue actions to maximize their ability to do so. This may include peaceful expansion of the economy through trade, or it may entail military action toward neighboring states in an effort to attain or gain access to needed resources. My dissertation seeks to explain the conditions under which societal groups rebel against their governments in the face of demographic pressure, as well as the conditions under which states select external military options when faced with demographic pressure.

Certainly, the notion that demographic pressure affects states' decisions concerning military action is not a novel one. The need to acquire land for a growing population, to extend 'living space' (*Lebensraum),* was a major justification for German territorial expansion under the Nazi regime (Fleming 1940, Kruszewski 1940). In the 1990s, scholars (Homer-Dixon 1991, Hauge and Ellingsen 1998, Percival and Homer-Dixon 1998, and Maxwell and Reuveny 2000, among others) evaluated demographic pressure and its association with environmental degradation as causes of both inter-state and intra-state conflict, though not often did they address both types of conflict in the same study. Critiques of these studies highlighted their lack of precision regarding concept definition, lack of systematic analysis, case selection based on the value of the dependent variable, failure to distinguish between domestic and international conflict, and confusion over the direction of causality.[1]

[1] See Ronnfeldt (1997) and Gleditsch (1998) for a thorough review of the limitations of this early research.

Demographic factors have received renewed attention recently from the academic community.[2] Responding to the critiques of previous studies, these new additions to the literature are more systematic in testing their theoretical propositions, either through statistical analysis or more rigorous case analysis. Where these recent contributions fall short, however, is in their failure to assess 'demographic pressure' conceptually and empirically, as well as their failure to distinguish between domestic and international conflict. These studies focus on specific demographic factors while excluding others. Thus, while addressing genocide (Midlarsky 2005), inequality (Besançon 2005), population growth and population density (Tir and Diehl 1998 and Kahl 2002), migration (Ware 2005 and Choucri 2002), or some limited combination of these factors (Urdal 2005 and Goldstone 2002), these studies fail to link these various factors in a systematic way and investigate how they interact with each other to influence the propensity of social groups or states to engage in civil or inter-state conflict, respectively.

A second limitation of these recent studies is their failure to specify the conditions under which demographic factors lead to civil conflict instead of inter-state conflict, or vice versa. No unified theory of how demographic factors lead to different types of conflict has yet been forwarded and tested. The current debate seems to center around two competing views of the earth's carrying capacity: neo-Malthusians versus Cornucopians. Urdal (2005) summarizes the framework under which both perspectives operate. The neo-Malthusians foresee a limited carrying capacity of the earth, meaning that the earth can only support a finite number of people, and once the carrying capacity of the earth has been reached, wide-spread suffering will follow as there will not be enough food, water or cropland for the earth's population. When resources become very limited, wars will erupt over the remaining unspoiled resources. The

[2] For examples, see especially recent special journal editions include *Journal of International Affairs* (Fall 2002), *European Journal of Population* (2005), and *Journal of Peace Research* (July 2005).

Cornucopians, on the other hand, contend that technological advances, such as the Green Revolution and genetically modified food, among others, will allow humans to increase the earth's carrying capacity. As long as technological advances outstrip population growth, wars over available resources will be unnecessary. Population growth may actually reduce the necessity of conflict, as a larger labor market will spur advancements in technology (Kahl 2002).

While these competing views of the earth's carrying capacity produce many predictions about the future prevalence of civil or inter-state conflict, they do not suggest hypotheses regarding the choices that states make when faced with demographic pressure. According to these perspectives, states are bystanders in this process with little agency to affect the prosperity or living conditions of their citizens. They may see crisis looming, but they do not act to avert disaster. This does not present a very convincing description of most states, however. Most International Relations scholars agree that state security and continued existence of the state are among the most important concerns of states. Indeed, regardless of regime type, state leaders seek to maintain their rule, either through electoral mandate or authoritarian rule. Factors with a destabilizing effect on domestic societies will garner the attention of state leaders, and in most cases, leaders will pursue strategies to mitigate the negative effects of these factors. Whether states will pursue peaceful strategies or military ones is an empirical question this dissertation addresses. Further, failure to manage demographic pressure may have serious negative consequences for governments in power, including civil unrest or rebellion. I also seek to explore the factors that lead to this outcome. Finally, if state governments seek to forestall domestic unrest, the external actions they take should lead to a reduction of civil violence, for if it does not, governments are not using their existing resources effectively. This link between inter- and intra-state conflicts in times of demographic pressure will also be briefly explored.

In the remainder of this chapter, I will outline the theoretical framework that I will use to answer the questions posed in this dissertation. This framework will be expanded in further detail in Chapter 3; however, it is worth summarizing briefly here. Following this brief summary of my main argument, I include an organizational plan for the remainder of the dissertation and I preview the results of the tests of several hypotheses tested in this project.

1.1 THEORETICAL FRAMEWORK

First, building on North (1981), I articulate how the government relies in large part on its population to fund the operations of the state, including the provision of public goods and services on which the people rely, through rent extraction. The state uses rents extracted from the domestic population through taxation to provide goods and services including external security, a justice system, infrastructure, and welfare-type goods such as education, housing, pensions, employment assistance/insurance, and many other goods.[3] Second, I define demographic pressure as an unsustainable demographic profile and discuss how the demographic characteristics of a state can become unmanageable for a state. As the population changes in size or distribution within the state, societal demands for goods and services are expected to shift as a result. Government resources may not be adequate to adapt to these shifting demands, especially if the shift within the population prevents the transfer of rents to the government. When the state

[3] As discussed in more detail in Chapter 3, I acknowledge that the state receives revenues from more sources than direct taxation of the domestic population. These other sources include, but are not limited to, profits from state-owned enterprises, tariffs on imported goods, foreign aid, sale of state property, including land, and the sale of government bonds or treasury notes.

becomes unable to adapt to the changing demands placed upon it, it is experiencing demographic pressure.

Third, I outline how this difficulty in meeting the demands of the domestic population may lead to a straining of the dependent and mutually beneficial relationship between the state and the population and discuss how each actor responds to this breakdown. For societal groups, inadequate public goods and service provision is expected to lead to or increase previously held grievances against the government. As Lichbach (1984) argues that grievance is a necessary condition of internal political violence against the state, the increase in grievances created by demographic pressure, under certain conditions, may lead to civil violence against the state. I propose a primary hypothesis that demographic pressure should be associated with an increased likelihood of civil conflict, given this grievance argument. I also argue, however, that the impact of demographic pressure should be conditioned by specific characteristics of the state. I hypothesize that wealthy states should be less prone to civil conflict than less wealthy states and that mixed regimes, those states with a mix of democratic and autocratic features, should be more prone to civil conflict than other types of regimes. I also make a series of hypotheses about how demographic pressure is expected to be conditioned by various identity characteristics of the society. Ethnic and religious fractionalization is expected to exert a non-linear relationship on the likelihood of civil conflict, while the number of languages spoken among the population is expected to increase the likelihood of civil conflict in a linear manner.

In addition to outlining how demographic pressure is expected to impact civil conflict, I also detail how it is expected to increase inter-state conflict. Assuming that government leaders are aware of the danger of civil unrest that arises when the state is experiencing demographic pressure, I argue, borrowing from the logic forwarded by Bueno de Mesquita et al. (2005), that

governments assess a variety of options available to them and search for a response to societal demands that will enable their political survival. Lateral pressure accounts of inter-state interactions (Choucri and North 1989), suggest that when demographic dynamics threaten to overwhelm states, governments can pursue a variety of options, including pursuing military conflict to acquire the land or resources needed to alleviate the pressure. Therefore, the main hypothesis springing from this argument is that demographic pressure should increase the likelihood that a state will initiate an inter-state dispute of sufficient severity to acquire the resources they need to diffuse domestic grievance. As on the civil conflict side, however, state attributes are expected to condition the impact of demographic pressure on violent conflict. While mixed regimes are again expected to be more conflict prone than other regimes, in the inter-state case, wealthy states should be more likely to engage in inter-state conflict when experiencing demographic pressure because they are more able than less wealthy states to bear the economic costs of inter-state conflict. Finally, because inter-state conflict is costly, I expect that states are unwilling to further jeopardize their economic vitality by attacking important trade partners.

The final aspect of the theoretical argument attempts to explain how inter- and intra-state conflict are related by arguing that if rational state leaders engage in external military conflict in order to reduce the likelihood of civil conflict, this reduction in domestic violence should be observed after an external military conflict. Therefore, I propose a hypothesis that predicts a decrease in the likelihood of civil conflict after a previous external military conflict. However, I also explore the possibility that external violence might exacerbate domestic grievances against the government due to a diversion of resources away from internal needs toward the external

prosecution of the military conflict or distract the government from dealing with the mobilization of internal rivals.

These three pieces linking demographic pressure and military conflict (civil conflict, inter-state conflict, and their relationship to each other), are explored in further detail in Chapter 3 and result in the formulation of eleven hypotheses. It is noteworthy that most previous research has focused on only one or two components of demographic pressure and their effect on *either* internal or external conflict. Therefore, while I undertake an ambitious endeavor in my attempt to assess the effect of multiple factors of demographic pressure on *both* internal and external conflict, the potential payoff is large in terms of furthering our understanding regarding how domestic grievances influence conflict decisions. In the next section, I outline how I will proceed.

1.2 ORGANIZATION PLAN OF THE DISSERTATION/PREVIEW OF FINDINGS

The remainder of this project will situate this project in the existing international relations (IR) literature, expand on the argument summarized in the previous section, test the hypotheses generated from the theoretical framework, and discuss the implications of this project for our understanding of inter- and intra-state conflict processes as well as our understanding of ways in which to reduce violent conflicts.

In the following chapter, Chapter 2, I situate this project in the existing IR literature. This task is complicated due to the variety of research programs to which this project attempts to speak. First, though both conflict processes that I address (inter-state and civil conflict) are richly researched and a wealth of studies have drawn a variety of conclusions regarding their

determinants, a relatively small number of studies have focused on the effect of the size and/or distribution of the domestic population on conflict behavior. Second, those studies that assess the link between demographic factors and conflict either focus narrowly on particular demographic characteristics or suffer from a lack of definitional clarity regarding their main independent variable. A third avenue of research applicable to this project involves the theorized links between inter- and intra-state conflicts. Various scholars have explored both systemic and state-level explanations for this proposed link; yet there is little consensus whether, in Starr's (1994) language, revolution leads to war, war leads to revolution, or these conflict processes are self-reinforcing.

Having situated this project in the broader literature, Chapter 3 articulates a theoretical framework, summarized in the previous section, which rests on the dependent and mutually beneficial relationship between the government and society and the damage to this relationship that demographic pressure can cause. In addition to presenting the theoretical framework, I articulate the eleven hypotheses tested in this project.

Because previous studies have been conceptually unclear about what exactly demographic pressure is, there is no consensus in the literature how such a concept should be measured. Therefore, in Chapter 4 I create a variety of indicators of demographic pressure which are employed in the empirical analyses in later chapters. The five demographic indicators I investigate in this study are population growth, age stratification, population density, urbanization, and refugees. These five measures are transformed into 'pressure' measures by dividing each by the state's wealth, to account for the extent of the state's ability to adapt to its demographic profile. I then combined these five individual measures into two separate composite measures of demographic pressure, an additive index and a factor score. The methods

by which I created these variables are detailed in this chapter, as well as their descriptive statistics.

With several ways to measure demographic pressure, Chapter 5 presents the tests for the first set of hypotheses which link demographic pressure and civil conflict. Across the various specifications of the main independent variable, *demographic pressure*, I found strong empirical support for the hypothesis that demographic pressure increases the likelihood of civil conflict. The impact of demographic pressure even proved to be robust to alternate specifications of the dependent variable. The support for conditional hypotheses was not as strong, however. No significant impact was found when demographic pressure was conditioned by either social cleavages or state wealth. The test for the impact of demographic pressure when conditioned by regime type weakly indicated that mixed regimes do have a higher likelihood of civil conflict than other regimes, but only at the highest levels of demographic pressure. This difference is not pronounced at lower levels of demographic pressure. Thus, while the main hypothesis of this chapter is supported, remaining work is needed to determine whether any attributes of the state or society exacerbate or mitigate the impact of demographic pressure on civil conflict involvement.

Turning to Chapter 6, I tested the hypotheses linking demographic pressure and inter-state conflict initiation using the same measures of demographic pressure formulated in Chapter 4 and employed in Chapter 5. Again, across all specifications of demographic pressure, I found strong empirical support for the main hypothesis of this chapter that demographic pressure is a significant predictor of an increased likelihood of inter-state conflict, a result that is also robust to alternate specifications of the dependent variable. Additionally, stronger support was found for the conditional hypotheses in this chapter than in the previous analysis. The effect of

demographic pressure is stronger for wealthy states than it is for less wealthy states, and states have a lower likelihood of attacking their important trade partners, even when they are experiencing demographic pressure. Another important finding, though not in support of the regime type hypothesis, is that demographic pressure affects all regime types approximately the same. Though high levels of demographic pressure resulted in a higher likelihood of inter-state conflict across regime types, anocracies were not more conflict prone that other regime types when experiencing demographic pressure.

Because I established in Chapter 5 that demographic pressure is associated with a higher likelihood of civil conflict and in Chapter 6 that it is associated with a higher likelihood of inter-state conflict, I also assessed in Chapter 6 whether the initiation of external conflict in the face of demographic pressure would reduce the likelihood of civil conflict. As hypothesized, I found that a previous external initiation is associated with a reduced likelihood of civil conflict. While this result may concern those who are interested in preventing all forms of violent military conflict, it does provide evidence to support the claim that governments may choose external violence as a means to prevent internal violence. The implications of this result, as well as the other results of this project are discussed in the final, concluding chapter of this project, Chapter 7.

Throughout this project, I refer to real-world examples of demographic pressure and military conflict to illustrate that the arguments presented here have validity beyond as an academic exercise. None of the examples presented in this project approaches a systematic case study; however, they do highlight that demographic pressure is experienced in states throughout the world, in both developed and developing countries, and that the result of such pressure can include military violence.

2.0 LITERATURE REVIEW

In this chapter, I will briefly summarize previous work relating to this project. I highlight this literature, not as an exhaustive detailing of all scholarship on the topic, but rather as a means to introduce the unfamiliar reader to part of the literature linking demographic pressure to inter- or intra-state conflict and to underscore the need for more research on this topic. Many of the studies cited in this chapter focus either on the dynamics present in particular countries, or they seek to develop theory but provide little empirical evidence to support their claims. Though this research has advanced our understanding of an underdeveloped and important topic, there are many questions left unanswered, including those addressed in this project.

2.1 WHAT IS DEMOGRAPHIC PRESSURE?

The size of the population within a country has frequently been cited as an important factor in determining the conflict behavior of states and societies. Indeed, Hegre and Sambanis (2006: 512), in their extensive review of the civil conflict literature, cite population size as one of the "three core variables that are almost always included in models of civil war onset." Other than size, however, other characteristics of a state's population are less frequently explored in political science, though recent attention to this topic has increased. One problem with this fledgling research program has been a lack of definitional clarity to the topic under

consideration. Many, including Aldis and Herd (2004), Boehmer and Sobek (2005), Brunborg and Urdal (2005), de Soysa (2002a), Graber (2004), Kahl (2002), Koning, Heerink, and Kauffman (2001), Landers (2005), Tir and Diehl (1998), Tole (2004), Umezaki et al. (2000), Urdal (2005; 2006), and Ware (2005), seek to investigate the importance of demographic or population pressure,[4] yet they fail to define the very concept they attempt to examine.

One notable exception to a lack of definitional clarity outside of political science is Sambrook, Pigozzi and Thomas (1999: 25). For them, "[p]opulation pressure is generally understood as an imbalance among a population, the food production system, and the available resources in an area." Because their interest is the impact of population pressure on deforestation and land degradation, they do not focus on the implications of population pressure for creating and aggregating grievances against the government. The population pressure they care about is the pressure on the *land*, not on the state, and therefore, they do not account for the ability of the government to adapt to demographic factors in their definition. However, like several of the scholars listed above, they discuss population pressure as a function of population growth only.

In a similarly Mathusian vein,[5] Shrestha and Conway (1985: 56) suggest that population pressure exists "when the existing (or growing) population of a given environment cannot be adequately supported by its carrying capacity" but they also focus on the economical and institutional context in which population growth occurs, arguing that resource scarcity is much more important than carrying capacity. Resource scarcity, they argue, can be caused both by the outright lack of resources and the relative distribution of resources throughout society, an act

[4] Many of these authors discuss 'population pressure' instead of 'demographic pressure', though this term is also rarely defined. Though I discuss 'demographic pressure' in this project, 'population pressure' can be substituted with little loss of meaning.

[5] Thomas Malthus (1993), in his influential 1798 essay, *An Essay on the Principle of Population*, highlighted the dangers of a large and growing population for the lives and livelihoods of the world's population, suggesting that disease and misery would be the fate of those living in areas which became overburdened with a population that outstripped the capacity of the land to provide food for the people.

either expressly perpetrated by the government or implicitly condoned by the government. Thus, while these scholars also focus primarily on the impact of population growth on resource depletion to the exclusion of other demographic factors and political outcomes,[6] they add the institutional context (the state) to their understanding of population pressure which is an important innovation.

One limitation in the political science literature is that most scholars fail to define what differentiates 'pressure' from 'non-pressure'. Most of these authors equate population pressure with high population growth, and for the most part, it appears as if a country does not have high population growth, it does not have population pressure. I take exception with this conceptualization of 'pressure' because, as I argue in Chapter 3, many countries would welcome periods of high population growth, and what is moderate for some countries may be 'high' for others and vice versa. Additionally, population growth is not the only demographic feature of a country that may lead to 'pressure'. While the growth rate affects the size of the population, other factors such as age distribution and where the population is located within the country may also play an important role in determining whether there is any 'pressure' within the country. This is not to suggest that other demographic factors are not considered by political scientists as important predictors of political outcomes. Indeed, as will be outlined below, scholars have explored several other demographic indicators; however, when discussing *population pressure* as a concept, they have restricted themselves mostly to population growth.[7]

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[6] As a point of clarification, Shrestha and Conway (1985) are ultimately interested in land redistribution after resource depletion caused by population pressure. While unarguably a political outcome, they do not detail the process through which population pressure results in land degradation and, more importantly, how the government determines that land redistribution is necessary. Thus, the link between population pressure and political outcomes is incompletely explored.

[7] One notable exception is Tir and Diehl's (1998) study of the effect of population pressure on inter-state conflict. In this treatment, they look at both population growth and population density.

In addition to these arguments regarding which demographic factors are involved and how much or little of them may exist within a country in order for these to be 'pressure', another limitation of the current conceptualizations is that is unclear who exerts and who feels the pressure. Is it the population, which is growing at a fast rate, or is it the government, which needs to provide goods and services to the people? In the conceptualization of demographic pressure that I propose in this project, it is the government that must adapt to the shifting population because such shifts lead to increasing demands for public goods and services from the people. Thus, the shifting population exerts pressure on the government to respond to their needs. Because of the limitations summarized here, I argue that more definitional clarity is needed for the concept of demographic or population pressure and seek to provide that clarity in Chapter 3.

Given the lack of definitional clarity regarding demographic or population pressure in the literature, especially within political science, I offer a definition of demographic pressure, an unsustainable demographic profile, and explain in more detail in Chapter 3 the elements of this definition and how it can assist researchers in our efforts to understand the impacts of demographic factors on a variety of political outcomes, including violent conflict, the outcome of importance for this project.

2.2 DEMOGRAPHIC PRESSURE AND CONFLICT

Having summarized the conceptual limitations of previous works, the following sections address the existing literature that links demographic factors with inter- and intra-state conflict. I highlight prior research for two reasons: to demonstrate that the questions posed in this project

are of interest to and speak to conflict scholars, and to identify the gaps in the current literature that this project attempts to fill. I begin with the more canvassed topic of demographic factors and civil conflict and then proceed to address the literature linking demographic factors with inter-state conflict.

2.2.1 Demographic pressure and civil conflict

The study of civil conflict in recent years has focused on the motivations of rebel groups to overthrow the current regime or secede from the territory of the state. The competing motivations identified by the literature are commonly referred to as 'greed' and 'grievance' reasons for civil conflict.[8] 'Greed' explanations tend to center around the plunderable nature of many natural resources in developing countries[9] as both an object of desire for rebel groups and a means of funding civil conflict, or the riches of the state to be gained by overthrowing the government. 'Grievance' explanations, on the other hand, tend to focus on the repression of or discrimination against groups with a country, including minority ethnic, linguistic or religious groups within a state.[10] While the study of these motivations has advanced our understanding of civil wars, these two explanations, at times competing, at others, complementary, fail to account adequately for the role of the state in civil conflict.

While 'greed' speaks to the opportunity for rebel mobilization and 'grievance' addresses the groups' motivation for rebellion, neither of these explanations discusses the part that the state plays in facilitating or preventing civil conflict. As most operational definitions of civil conflict

[8] See Collier and Hoeffler (1998; 2002), Murshed (2002), and de Soysa (2002a) for examples of this literature.
[9] See Ballentine and Sherman (2003), Carter (2003), and Ross (2003) for further discussion of this 'greed' explanation.
[10] See Gurr (1970), Ellingsen (2000) and the Minorities at Risk project for work in this area.

(Sarkees et al. 2003; Gleditsch et al. 2002) include the government of the state as a key player in the conflict,[11] it is strange that the roll of the state is often overlooked in explanations of civil conflict. When the state is considered, it is as Ballentine and Sherman (2003: 9) consider them. They cite weak and failing states as a permissive cause of civil conflict because they are "characterized by loss of legitimacy and a loss of governing effectiveness in all or significant parts of their territory. . .Importantly, state weakness is a critical component of the opportunity structure that makes violent challenges militarily and economically feasible." While this 'weak state' explanation for civil conflict, which has been popularized by Fearon and Laitin (2003), is useful in accounting for a *permissive* cause of civil conflict, this explanation does not allow for the state to take an active role in attempting to prevent civil conflict. Also missing from this discussion are the factors that lead states to lose legitimacy and effectiveness in the estimation of their people which would lead to conflict behavior among the people. I argue that demographic pressure may be viewed as a factor that leads to such loss of legitimacy through the breakdown of the dependent and mutually beneficial relationship between the state and its society. This relationship will also be expanded in Chapter 3.

Separate from the greed-grievance framework, many scholars have investigated the links between demographic factors and civil conflict, including Urdal (2004, 2005, 2006), Martin (2005), Goldstone (2002), Kahl (2002), Brennan-Galvin (2002), DeVotta (2002), Toft (2002), Slack and Doyon (2001), Randall (2005), Ware (2005), Matthew (2002), and Midlarsky (2005). By isolating individual demographic factors, these scholars have explained the dangers of 'youth

[11] It is important to note that the Correlates of War project has included a categorization of intra-state war (inter-communal war) which pits two non-state groups against each other without the participation of the state government (Sarkees et al. 2003: 59).

bulges'[12] (Urdal 2004, 2006), refugees (Lischer 2006, Martin 2005, Midlarsky 2005), population growth (Urdal 2005, Goldstone 2002), and urbanization (Brennan-Galvin 2002), but these studies have failed to engage the wider literature on civil conflict because they do not situate their arguments within a widely accepted framework, nor have they attempted to argue that their theories are more broadly applicable to other studies of civil conflict. One of the aims of this project is to bring these two literatures closer together by proposing a theoretical framework that situates demographic factors into the greed-grievance framework through the grievances that may arise in a state experiencing demographic pressure.

Additionally, these studies focus primarily on one particular factor that the author believes to be associated with civil conflict, and they have not satisfactorily detailed how many of these factors work together to strain the resources of the state or exacerbate problems within the domestic society. As will be shown in Chapter 4 in the discussion of the index of demographic pressure I created, many states do not suffer 'pressure' from just one source. For example, a state with a large population growth will mostly likely also have a large percentage of young people in their society. Thus, these factors may work together to increase pressure in the society. Current studies do not address this dynamic, or the possible interaction of several demographic factors. Another innovation of this project is the combination of five separate demographic indicators (population growth, age stratification, population density, urbanization and refugees) into one measure of demographic pressure.

Additionally, because they have not adequately conceptualized *demographic pressure*, as I discussed in a previous section, it is unclear how one might empirically test many of their claims. Empirical tests are needed due to a third critique of the current literature: the lack of

[12] Youth bulges, as defined by Urdal (2004: 1) are "extraordinary large youth cohorts relative to the adult population."

generalizability of many of the studies. Though some of this work engages in large-N statistical analysis,[13] much of it has focused on particular case studies, and though this is a very valuable process for theory building, there have been few studies that test these theories across cases. Thus, while we may now know more about population pressure in protohistoric Korea (Kang 2000), urbanization in China (Mackenzie 2002), demography and climate in Northeast Brazil (Chimeli, Mutter and Ropelewsi 2002), migration from South Africa (Crush 2002) or Uganda and Sudan (Singh et al. 2005), population pressure in the Dominican Republic (Sambrook, Pignozzi and Thomas 1999), pre- and post-war demography in Cambodia (Neupert and Prum 2005), refugee health in Rwanda (Verwimp and Van Bavel 2005), or the impact of population pressure on food production in Papau New Guinea (Umezaki et al. 2000), it is unclear whether our new knowledge will help us understand these phenomena elsewhere.[14]

Finally, the arguments forwarded in this paper are also distinct from a prominent research agenda centered at the University of Toronto in the 1990s. The work of the Toronto group played a large role in raising the profile of research on the environmental and demographic causes of civil conflict, but it has been criticized for theoretical fuzziness and choosing cases on the dependent variable (Gleditsch and Urdal 2002). One strand of this research agenda attempted to link population factors to environmental degradation or resource depletion which led to conflict over the control of and access to scarce resources (Homer-Dixon 1991; Percival and Homer-Dixon 1998). My project makes no claims about environmental damage as a result of population factors, though it does not deny that these relationships may in fact exist. Rather, I focus on the increased demand on the state, in the form of a shifting population, and the state's

[13] I want to highlight Urdal's (2004, 2005, 2006) work particularly, and also Tir and Diehl (1998).
[14] To be fair, several of these cited articles are not published in political science journals; however, it is indicative of the state of the demographic research in the political science discipline that it is challenging to locate many articles that address demographic factors.

response to that demand. The environmental impacts of a growing population are not considered.

2.2.2 Demographic pressure and inter-state conflict

While the literature linking demographic factors and civil conflict is somewhat sparse, the literature linking demographic factors and inter-state conflict is even thinner. In this section, I will summarize two works that address the variables of concern in this project. The first set of works discusses lateral pressure accounts of inter-state conflict, and the second work provides quantitative justification for the belief that population factors impact the likelihood of inter-state conflict. The paucity of literature on this topic may seem to indicate that the political science community is uninterested in or unconvinced by arguments linking these processes together; however, I argue that domestic factors other than regime type, such as demographic factors have received too little attention from the conflict community, and the size, shape and distribution of a state's population may provide additional insights previously overlooked.

The first work I assess is that of Choucri and North (1975; 1989), who argue that the population, technology and resource allotment within a state affect the external relations of that state, depending on the demands of the population. In some regards, their discussion (Choucri and North 1989: 291) of some core elements to their argument echo those of Gurr (1970) is his notion of relative deprivation:

> Acting to satisfy their needs and requirements, people make demands on themselves and on their physical and social environments. A demand, which may not be communicated successfully or effectively satisfied, is defined as an "expression of opinion" coming from a need or desire to close a gap between a perception of fact ("what is") and a perception of value ("what ought to be"). Demands combine with capabilities to produce action.

Thus, while Gurr (1970) maintains that the gap between "perception of fact" and "perception of value" at the individual level is what leads to grievance and potential internal conflict, Choucri and North argue that rather than turn in on themselves, populations will extend outward to get what they perceive that they need to survive. Those states with the capacity to extend externally will do so to achieve their ends, which are based on popular demand.

Choucri and North (1989) do not suggest that all states experiencing population pressure will engage in external conflict. First, those that lack the capability to prosecute a successful military campaign will not attempt to acquire resources through this channel. Second, other external extensions may achieve the same end without the cost of external conflict. These other options include international trade and alliance formation. In the first instance, states can trade peacefully with other states to acquire needed resources, while in the second instance, forming alliances with other states may allow states to reduce defense spending and allocate those funds to support domestic demand. Thus, while demographic factors may lead to external military violence, Choucri and North suggest that other factors may make external violence more or less attractive to governments, a notion that I adopt in my analysis.

Another study that has also explored the links between population factors and inter-state conflict was performed by Tir and Diehl (1998). Like this project, Tir and Diehl used quantitative methodology to assess the impact of population factors on the occurrence of inter-state disputes; however, we differ on both theoretical and methodological grounds. Theoretically, Tir and Diehl outline three possible causal mechanisms linking population factors to interstate conflict: (1) resource scarcity, a la Thomas Malthus which predicts that populations grow more quickly than the resources needed to support them, leading states to fight over scarce resources; (2) lateral pressure theory, which was outlined in above; and (3) military capability,

less a theory and more a necessary condition for the initiation of conflict. Tir and Diehl do not specify which perspective they espouse in their study, but simply adopt as a working hypothesis that population factors increase the likelihood of inter-state conflict. This study deviates from theirs by explicitly forwarding a theory of state-society interaction that prompts states to respond to societal demands. It also draws from lateral pressure accounts of inter-state conflict to account for alternate policies a state could pursue instead of inter-state conflict.

Methodologically, this study also diverges from Tir and Diehl's assessment. They employ a country-year unit of analysis to determine a state's likelihood to be involved in an inter-state dispute, without taking into account dyadic features common in many quantitative studies of interstate conflict[15] or the confluence of state-specific factors and dyadic factors, as I do in this paper. As Starr (1994: 495, *emphasis in original*) reminds us, "War as a conflict situation *must* be recognized as the *interdependent outcome* of the behavior of two or more actors." Thus, while they find initial support for their claim that population pressure moderately increases the likelihood for states to engage in conflict, they do not account for the political relations between states that may increase or decrease the likelihood of this outcome. By testing a model of dispute initiation that utilizes a directed-dyad year approach, I am able to illustrate that state-specific population factors increase the likelihood of challenger initiation of an inter-state dispute against a target while controlling for dyadic factors.

[15] See Oneal and Russett (1997; 1999) and Russett, Oneal and Davis (1998) for some examples of this type of research.

2.3 RELATIONSHIP BETWEEN INTER- AND INTRA-STATE CONFLICT

The previous section summarized previous academic work that links demographic or population pressure to inter- and intra-state conflict. It is striking how much more developed this literature is on the civil conflict side; however it is interesting to note that the most frequently cited demographic factor in the civil conflict literature is population growth, and that is the main demographic factor of concern to both Choucri and North (1975; 1989) and Tir and Diehl (1998). If population growth leads to *both* inter- and intra-state conflicts, then when can we expect this factor to trigger one type of conflict and not the other? Additionally, can population growth lead a country to experience both types of conflict? These are the questions that initially triggered the idea for this study and prompted this exploration of the link between internal and external conflict.

While some studies (for example, Forman 1972) focus on the internationalization of civil conflict, when third parties join civil conflicts in order to shape or affect the post-war distribution of power among states, many more studies focus on the impact of civil conflict on inter-state conflict. Heldt (1997) highlights several studies that find one of three outcomes linking civil conflict with external conflict: a positive relationship, a negative relationship, and a curvilinear relationship. The most common finding is a positive relationship between civil and inter-state conflict, and is most popularly discussed within diversionary explanations for conflict, which will be discussed in greater detail below. Before moving to this explanation, however, I will briefly discuss the other two possible relationships. While Heldt (1997) acknowledges that these results are rarely seen, he suggests that a negative relationship between internal and external conflict may arise if governments become internally focused and therefore, their external belligerence declines while their attention is directed inward. Starr (1994), on the other hand,

suggests that this type of inward focus makes states attractive *targets* for other states. In terms of the curvilinear relationship between internal and external conflict, Heldt (1997) suggests that at low levels of domestic dissatisfaction, diversionary strategies may prove effective, but at high levels of dissatisfaction, leaders must turn their attention inward. It is when states face a moderate amount of domestic dissatisfaction that they engage in external conflict. Again, however, the relationship between civil and inter-state conflict is most often theorized to be positive, to which I now turn.

Studies on diversionary incentives for external conflict (Leeds and Davis 1997, Levy 1989, Morgan and Bickers 1992, Richards et al. 1993, and Davies 2002) focus on executive efforts to *distract* the public, while this paper proposes that states act based on the *demands* of the public. A desire by states to meet the demands of their people does not necessarily imply an altruistic pursuit. In fact, I expect states (and their leaders) to act rationally when facing the demands of the population, and I argue that meeting domestic demand for public goods and services is a rational pursuit to prevent internal protest and rebellion. Differentiating between a diversionary external conflict and one in which the state is attempting to acquire needed resources may not be very easy, however. Demographic pressure is likely associated with the very measures these authors use to proxy diversionary incentives, low economic growth rates and falling public opinion, and few governments would admit that they were starting a conflict in order to divert or distract their domestic audience, suggesting that stated war aims may Also not be useful. On one level, it may not matter which motivation is prompting states to engage in external conflict, as long as demographic pressure is the proximate cause. On another level, however, if demographic pressure remained in the country after the war was completed, the domestic demands are not expected to decrease, which may lead to domestic conflict anyway.

Therefore, diversionary theories cannot account for a reduction in demographic pressure and the grievances associated with it, and is thus, not expected to explain inter-state conflict in the presence of demographic pressure.

Kegley, Richardson and Richter (1978: 746) suggest three ways in which a state may respond to internal conflict: "(1) ameliorate stresses by offering adaptation rewards, (2) suppress internal conflict by coercion, and (3) externalize domestic conflict by means of conflictual foreign policy." Beginning with the following chapter, I argue that (1) demographic pressure affects a state's ability to adapt to domestic demands and offer "rewards" to dissatisfied groups within the population, (2) not all states can credibly suppress their populations, nor do many of them have effective repressive mechanisms, and (3) under some conditions, external military conflict may be a viable option to states hoping to reduce the likelihood of internal rebellion. It is to these arguments that I now turn.

3.0 OF THE PEOPLE? THE POLITICAL CONTRACT, DEMOGRAPHIC PRESSURE, AND CONFLICT

In this project, I attempt to determine how demographic pressure affects participation in both inter- and intra-state military conflict. This chapter lays out a theory of state-society interaction that highlights the motivations of governments and societal groups to engage in conflict when experiencing demographic pressure. Briefly, governments seek to remain in power and maintain the territorial integrity of the state, and to do so, they need the support of the citizens to stave off attempts by internal and external rivals to take over control of the government or exert sovereign control over part of the state's territory. Additionally, governments extract rents from society in return for service provision, including providing security against external and internal aggressors, a legal system, physical infrastructure, and a myriad of social services including education provision, health care, and employment benefits. Not every state provides extensive services, nor does every state have the bureaucratic infrastructure to collect taxes in an orderly manner. Regardless, governments spend some amount of their revenue on service provision in order to meet the demands of society. Members of society, on the other hand, surrender rents to the government in return for the goods and services that the state provides.

Demographic pressure, as defined below, can disrupt this cycle of 'service provision for rents received' as societal demands shift and governments struggle to adapt to such fluctuations. States that find themselves short on revenue have an increased incentive to act to keep the people

contented, while societies, whose needs are not being adequately met, may begin to look for others to lead them. This perilous situation can lead to either internal or external conflict. State leaders may pursue external military action to alleviate domestic pressure through resource or territory seizure or to force change in another state that may lead to a reduction of external rivals or increased access to goods. Internally, government shortfalls may lead to or exacerbate existing grievances, or they may reduce the opportunity costs of internal conflict. Therefore, as presented in more detail below, conflict behavior may arise as a result of demographic pressure.

Before outlining the relationship between the state and society upon which my theory rests, however, it is important to clarify the two dominant actors in this framework. Because *state* and *society* are inexorably linked in this dissertation, it is perhaps useful to define each term in relation to the other. First, when referencing 'the state', I utilize a Weber-inspired definition by Migdal (1988: 19):

> [I]t is an organization, composed of numerous agencies led and coordinated by the state's leadership (executive authority) that has the ability or authority to make and implement the binding rules for all the people as well as the parameters of rule making for other social organizations in a given territory, using force if necessary to have its way.

While this definition includes a reference to physical territory over which the "executive authority" exerts, or attempts to exert, jurisdiction, when referring to 'the state', I intend to connote the central government of the territory, or those who lead the government, because I am interested in the incentives and motivations of 'the state' that lead to conflict behavior, not the geographical bounds that constrain action. Therefore, I will often use 'state', 'government', and 'leaders' interchangeably.[16]

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[16] Though I refer to leaders of government, this project does not delve into individual-level (first image) explanations of conflict; rather, government leaders are assumed to act rationally and make decisions as a unit. Those members of government or society (defined below) that seek to replace the key decision makers in the government are considered internal rivals to the government, and while the positions and promises of such rivals

The second actor in the state-society relationship, *society* is "all the people" over which the state has jurisdiction. These people may be members of smaller social groups within the larger society (Gilbert 2006), and these smaller groups may have different desires regarding the "binding rules" which are established; however, they are all legally subject to the rules of the executive. As we shall see later in the discussion of demographic pressure, this simple definition is complicated when taking into account certain groups within the state. Typically, all people within the territory of a state are subject to its jurisdiction,[17] but not all of those people are citizens (migrants or refugees) or enjoy the full privileges of being a member of society (disenfranchised). Usually, it is only the citizens of a state that have the right to expect the state to respond to their needs and demands, and thus, may claim membership in the society. However, groups of non-citizens within a state may also have needs and demands and are subject to the laws of the state. How the government responds to such groups (and the states from which they came) affects the relationship between the state and its own people.[18]

Having provided definitions for the two main actors in this dissertation, this chapter expands the previously summarized theoretical arguments and introduces the hypotheses to be tested in Chapters 5 and 6. Section 3.1 details the political contract between states and their societies, while Section 3.2 explains what demographic pressure is and how it can lead to a

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affect the motivations of the government leaders, the rivals themselves may or may not be a part of the decision making structure of the government. This situation is especially complicated in democracies where members of the opposition frequently participate in state decisions while simultaneously are attempting to replace the sitting leader. Thus, while internal rivals are always a threat to the sitting government, this threat may not be a lethal one. My notion of the state is roughly equivalent to Bueno de Mesquita et al.'s (2005: 39) notion of 'leadership (L)'.

[17] An exception would be those representatives of other states that enjoy diplomatic immunity while residing in another state.

[18] This characterization of society is similar to Bueno de Mesquita et al.'s (2005: 39) notion of 'residents' rather than their 'selectorate' (those members of society that "have a government-granted say in the selection of leaders" (Bueno de Mesquita et al 2005.: 42)) because I choose to include the disenfranchised in my definition of the larger society. My aim, in part, is to explain the circumstances that lead societies to rebel against their leaders and I choose to allow *all* members of society to play a potential role. Indeed, Bueno de Mesquita et al. (2005: 40) acknowledge that "one goal of revolutions is to replace members of the selectorate with individuals from the disenfranchised group, or to add this group to the selectorate."

straining of the state-society relationship. Section 3.3 outlines the motivations and incentives of societal groups regarding civil conflict in the face of demographic pressure, and the state regarding inter-state conflict under the same circumstances. The chapter concludes with a summary of the argument and a preview of the empirical chapters to follow.

3.1 THE POLITICAL CONTRACT[19]

> The state, paraphrasing Max Weber, is the institutional reflection of a community that claims a monopoly of the legitimate use of force, a compulsory association that enjoys legitimate authority derived from law and tradition. Government represents, but does not exhaust, the presence of the state in society. The state affects collective action by providing both certain key motives for mobilization as well as the channels or means through which collective action is expressed. The state creates both critical problems and opportunity structures.[20]

The idea of a political contract between the state and its society is certainly not a new concept. In the framework utilized in this project, the state creates laws to establish the property rights of the population and creates a system through which those rights can be enforced. In return individuals submit to the laws of the state because they receive more benefit from entering into the contract than they can maintain living outside the contract. They also provide a share of the means by which the state can run, i.e., rents. North (1981) highlights that this relationship between the state and its citizens is one of mutual benefit. The state receives revenue in the form

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[19] The political contract to which I refer in this chapter is different from the *social contract*, expounded upon by theorists such as Locke, Rousseau and others. I am not referring to a theoretical justification for humans to escape the State of Nature, nor do I suggest that citizens have a formal, legally-binding arrangement with their political leaders which all citizens sign before becoming members of a society. Rather, by 'political contract' I mean that both government and members of society act *as if* there is an agreement (as described below), and both sides uphold their end of the 'bargain' unless extraordinary circumstances prevent them from doing so. See North (1981), Furubotn and Richter (1997) and Holmes and Sunstein (1999).

[20] Walton (1998: 463).

of taxes and other rents from the citizens in return for providing protection and justice. Many modern states are also expected to provide welfare-enhancing services, such as education, health care, employment insurance, pensions, environmental protection, and early child care in addition to law enforcement and defense for the revenue collected or extracted from the citizens. Other public goods such as physical infrastructure (roads, bridges, airports, etc.) are also provided by the government to society. At times the government demands additional revenue to fund state-sponsored programs and initiatives, and in other instances, the citizens demand that the government add additional programs as new needs arise.

While there is a substantial difference between developed and developing states in the ability of states to tax and collect rents effectively and the extent of state service provision, the similarity in the relationship between state and society in both contexts is greater than the differences. For example, while the advanced industrial welfare states of Europe, North America and Oceania are known for generous state-sponsored retirement compensation packages, free primary and secondary education, nationalized health care (with the notable exception of the United States), strong infrastructure and many other services paid for with moderately high to high tax rates, developing countries also provide a litany of services, even if more sporadically. Rudra (2007) discusses the differences among welfare states in the developing world, finding that some states focus government spending on education and health services that will benefit a wide range of citizens, while other states focus on more protective strategies and focus their government spending on specific groups (labor, for example). Additionally, Rudra and Haggard (2005) indicate that concerns about social spending are not limited only to developing democracies, but autocracies and mixed regimes as well. Thus, the diversity of welfare regime types suggests that while government spending patterns may not map exactly onto those of the

advanced industrialized countries, governments in developing countries do choose public spending policies that provide a wide array of services to their people.

A delicate balancing act is therefore maintained: society transfers revenue to the government and the government provides public goods to society.[21] Because a state cannot provide services without revenue (Holmes and Sunstein 1999) and citizens may refuse or be unable to provide such revenue if the state does not provide services they deem important, the relationship between state and society may be strained if either of these two functions (payment or provision) is constrained.

The people, for their part, assess the success of their government at providing public goods and services. If the government is failing in its efforts, the people can opt to replace the government that is not providing services to their satisfaction. In countries with regular electoral processes, this might be as simple as 'turning the bums out' during the next election. At times, however, the grievances of the population may be more severe and may require more drastic action on the part of the citizenry. Civil protest or outright rebellion may occur, depending on the severity of the service curtailment. Strikes and demonstrations are popular non-violent means by which society expresses its discontent with the policies of the government in power; however, if the popular discontent continues without an adequate government response, riots or other forms of small scale violence may erupt, which may escalate into large scale violence, such as a civil war.[22] Additionally, if the grievances are concentrated in a particular region of the

[21] It is important to acknowledge that not every state collects taxes or other revenue directly from the people, and some states that do collect revenues appropriate it for the personal use of the leaders. Many states, especially underdeveloped ones, do not have efficient tax collection bureaucracies and gather revenue from state-owned enterprises or the sale of raw materials or commodities, while others accept bribes for some services rendered, rather than providing public goods to all the people. See McGovern (2005), Juul (2006), Suliman (2005), and Fauvelle-Aymar (1999) for further details of revenue collection, especially in developing countries.

[22] This process does not always occur as a neat progression (non-violent action, low-level violence, high-level violence. See Wallensteen and Sollenberg (1999).

country, ethnic, linguistic, or religious differences between members of that region and those in the rest of the country may lead to separatist movements, especially if service provision or public policy discriminates against those in the affected region.

Because governments and those who lead them are not usually interested in being the targets of social upheaval, they will pursue a strategy to protect themselves from overthrow or the state from secessionist groups. Bueno de Mesquita et al. (2005: 26) claim, "Political survival is put at risk whenever leaders lack the resources to maintain the support of essential backers." The larger and more disaffected is that group of "essential backers," the more precarious the government's position becomes.[23] Because most governments attempt at least to maintain the appearance of legitimacy in the eyes of their publics (Murshed 2002), they may have few choices regarding how they deal with shortfalls of revenue provision or a downturn in the economy. A government can employ more coercive means of revenue extraction through heavy-handed taxation or outright theft from the population. This strategy, however, is not likely to endear the government to the citizens who are struggling to meet their financial obligation to the state. First, even if states have the capability to raise taxes and collect them effectively, if the people do not have sufficient income or product to tax, raising taxes adds little wealth to the government coffers. Second, kleptocratic governments are not typically the best stewards of the people's resources, and they rarely use the ill-gotten revenue to provide public goods and uphold their end of the political contract (Höijer 2004; Ellis and Freeman 2004).

Alternatively, the government may attempt to cut costs by slashing the number and/or extent of services provided to the citizens, or other 'belt-tightening' austerity measures. This,

[23] Even if members of the selectorate are not adversely affected during lean times, internal rivals may still seize the opportunity to mobilize the disenfranchised by promising them the benefits of the selectorate if they help remove the sitting leaders.

also, may prove to be an unpopular strategy to pursue as society often looks to the government to provide extra services in bad economic situations to help the people until the economy improves (unemployment insurance, food assistance, or education training, for example). By slashing services due to an economic shortfall, the population would be neglected by the government when their help is most needed, creating or exacerbating grievances against the government.

Finally, the government could borrow money internationally, or engage in deficit spending until the economic situation improves in order to continue to provide public goods and services. Developed countries typically have far more avenues through which they can fund spending programs than their counterparts in the developing world. Though developed countries are least likely to experience devastating economic setbacks which would require severe belt-tightening, these are the very countries with reliable access to international credit and financing. Developing countries, on the other hand, especially the poorest in the world, have very little ability to borrow money internationally, and acquiring resources from other countries via foreign aid or the international institutions such as the International Monetary Fund or World Bank is a time-consuming, highly political process that, even if successful, might not give governments the flexibility to apply the newly acquired resources to the people in a manner of their choosing.

Assessing these actors together, then, an economic downturn within a country may adversely affect both members of society and the government. Such an economic situation may lead to grievances within the population, especially if societal groups can mobilize against the government. In such situations, government leaders would need to address group demands to protect their rule or the territorial integrity of their country. Not every instance of popular discontent would lead to mobilized action against the state; however, many governments do not wish to seem unresponsive to the public, especially if they are reliant on the public for their

leadership. If internal options are not available to the state due to the economic and/or political situation within the country, possible courses of action could include looking outside a country's borders, either peacefully or militaristically. Before exploring in more detail the conflict decisions states and societies make in the face of disruption in the state-society relationship; however, it is necessary to detail what may lead to such a disruption initially.

3.2 DEMOGRAPHIC PRESSURE AND THE BREAKDOWN OF THE POLITICAL CONTRACT

This section details what demographic pressure is, differentiating between a state's demographic profile and the circumstances under which such a profile might create problems for the smooth functioning of the state. I will discuss five different components of a state's demographic profile, including population growth, population density, urbanization, age structure, and refugee populations, and detail how each of these factors may be beneficial or harmful regarding the supply and demand of public goods. Additionally, I will discuss how demographic pressure can produce a breakdown in the political contract between the state and society and preview the consequences of such a breakdown.

3.2.1 What is demographic pressure?

Before outlining how demographic pressure might lead to a breakdown in the state-society relationship, it is important to clarify what exactly demographic pressure is.[24] This concept has not been well-defined in the literature; in fact, it is rarely defined at all in academic texts.[25] Every country has a unique demographic profile, and changes to that profile are inevitable in all countries. Births and deaths, within-country migration, immigration, and emigration are common occurrences. At what point, however, do these common occurrences lead to pressure?

Frequently, demographic (or population) pressure refers to 'high' levels of one or more population variables, including birth rates, death rates, population growth, youth cohorts, urbanization, immigrants, refugees, and others. It does not follow, however, that high levels of certain population variables would automatically lead to any kind of 'pressure'. For example, states with aging populations, such as those in Europe or Japan would welcome many years with larger than average youth cohorts to decrease their looming pension/welfare crises. In fact, low values of such variables are creating enormous pressure on current workers to fund pension schemes from which they may not benefit.[26] Additionally, land-rich countries such as Canada or Australia might welcome a high population growth rate if the larger number of workers would improve those countries' economic performance. In these situations, 'low' values of many demographic indicators create economic problems for states.

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[24] Most authors (Tir and Diehl 1998, for example) discuss 'population pressure' instead of 'demographic pressure', and they similarly fail to define the term adequately.

[25] As examples, see Aldis and Herd (2004), Boehmer and Sobek (2005), Brunborg and Urdal (2005), de Soysa (2002a), Graber (2004), Kahl (2002), Konig, Heerinke, and Kauffman (2001), Landers (2005), Tir and Diehl (1998), Tole (2004), Umezaki et al. (2000), Urdal (2005; 2006), and Ware (2005). Some notable exceptions outside of political science include Sambrook, Pigozzi and Thomas (1999) and Shrestha and Conway (1985).

[26] "Cloud, or silver linings? Japan's changing demography." *The Economist* (US edition), 28 July 2007.

On the other hand, a lack of economic opportunities in many African and Asian countries means that large youth cohorts with few employment opportunities increase the strain on governments. Indeed, in economically underdeveloped countries, even moderate increases in youth, refugees or population in general might create a strain that would be easily accommodated in a more economically stable country. Thus, demographic pressure is more than high (or low) levels of any one variable; the capacity of the state to accommodate changes must also be taken into account.[27]

I define *demographic pressure* as an unsustainable demographic profile. This definition allows for demographic pressure to be a result of 'high' demographic levels, as well as 'low' demographic levels. If a state's demographic profile is unsustainable, the state is unable to continue along the same path without depleting or damaging the national economy.[28] Therefore, this definition also incorporates the wealth and vitality of the state's economy, resulting in a definition which leads to neither deterministic outcomes ('X' amount of population growth automatically leads to demographic pressure), nor does it neglect the economic structure in which the population and government operate. Thus, both society (population) and the state (economy) are represented in the definition of demographic pressure.[29]

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[27] I do not want to suggest by these examples that developed states cannot experience demographic pressure, or that less wealthy states are doomed to experience it. Rather, these examples are meant simply to illustrate how the demographic profile in one country might prove to be problematic, while that same profile in another country might be considered a blessing.

[28] (Un)sustainability is also frequently discussed in terms of the environment and fragile ecosystems. By using this phrase in my definition of demographic pressure, I do not mean to carry the baggage associated with sustainable development, resource conservation, and environmental degradation because I am not hypothesizing about nor testing the empirical link between demographic pressure and environmental degradation. Rather, I suggest that separate from the environmental consequences of demographic pressure, a state's demographic profile may strain the economic capacity of that state in an unsustainable manner. The government may be unable to stimulate the economy and collect revenue to provide health, education, pension, and/or employment opportunities for the population.

[29] I am not suggesting that states have full control of their economies; rather, I assume that states have tools at their disposal to address market failures and to increase incentives to economic actors that may enhance economic growth. This may include setting the tax rate, subsidizing industry or agriculture, reducing/increasing tariffs or other

3.2.2 How does demographic pressure lead to breakdown?

> In diagnoses of contemporary threats to state stability, urbanization is inevitably included among the litany of emerging challenges, along with growing cross-border flows of asylum seekers and illegal migrants, continuing high rates of population growth and young age structures in certain poor, unstable countries.[30]

The link between states and their societies as presented here is relatively simple: societies expect and demand services from the state in return for rents received, and states exhaust available means to maintain service provision in order to maintain domestic stability and prevent state collapse. North (1981: 29) states that the precarious balance between society's needs and the state's ability to provide for them may lead to great instability within the state: "Changes in information costs, technology, and population . . . are all obvious destabilizing influences." As populations change, more state support is needed for education, health and welfare programs, assistance for the elderly, sufficient land allocations, potable drinking water, etc. Unexpected influxes of refugees might overwhelm local efforts to provide services, precipitating a response from the national government. Because there are many different elements within a state's demographic profile, fluctuations in any one element may or may not strain the resources of the state. Frequently, states can adapt by temporarily shifting funding to those services that are in most need of support, and given a generally stable economic situation, such reallocations in funding are manageable. In this instance, the state's demographic profile is sustainable, and thus, would not qualify as demographic pressure because the state is able to respond to the shifting needs of the population. There are circumstances, however, that make state adaptation

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non-tariff barriers to trade, changing monetary policy, adjusting fiscal policy, and other measures beyond the workings of the 'invisible hand' of the market. Also, measures of state wealth are often used to proxy state strength, with the notion that wealthier countries are typically those with the strongest institutions, while less wealthy states often have more fragile, or less stable, institutions (Fearon and Laitin 2003).

[30] Brennan-Galvin 2002: 123.

more difficult and can be grouped into two general categories: (1) changes within the internal population, and (2) movement of people across borders.[31]

3.2.2.1 Population growth

To maintain a steady number of people in the world, reproduction must occur at or around the *replacement rate*. This is generally considered to be at approximately 2.1 children per woman; however, a major 'hidden' component of the replacement rate is a country's mortality rate. In countries, such as in the developing world where mortality rates are higher than in the developed world, the replacement rate is higher (more births are needed to make up for the number of people who die before reaching the middle of the fertility schedule[32]), and where mortality rates are low, such as in the developed world, replacement rates hover very close to 2.1.[33] Growth rates, then, too have different meanings for different countries, as states grow only when more children are produced than the replacement rate. Additionally, often found in the developing world, improvements in medical technology have led to a reduction in maternal and infant mortality. In these regions population growth rates have increased as more children survive beyond infancy, mothers survive through childbirth and have more children, and life expectancy increases.

Population growth leads to more members of society in need of government services while it also (in time) increases the number of people who contribute revenue to the government. Thus, moderate population growth can be economically positive for a state which adds to its

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[31] The following discussion of demographic factors seeks to lay out an argument for what these factors are and why they may disrupt the state-society relationship. How they are measured for empirical analysis will be discussed in Chapter 4.

[32] The age range for which women are considered to be fertile is typically 15-45 or 15-49, making the middle of the fertility schedule between 30 and 32 years old (Espenshade, Guzman and Westoff 2003).

[33] See Espenshade, Guzman and Westoff (2003) for a discussion of replacement rates that vary by country.

productivity, while economies of scale in service provision entail that the marginal cost of each additional person is negligible for the government. Problems arise, however, when population growth (or decline) is rapid or unmanageable. Shrinking populations reduce the tax base, and depending on age stratification, may lead to an increased burden on the working-aged population when it is asked to support aging generations. States must be creative in dealing with this situation by creating incentives for child-bearing, as well as enticing labor to emigrate from other countries to keep productivity increasing. This is a problem faced by many countries in Europe and Japan.

Alternately, high population growth may occur more rapidly than countries can accommodate. The specific problem of large youth cohorts will be discussed separately, but in general, rapid increases in population create demands on the government. Large growth rates extend beyond small changes at the margins of government spending or goods provision and may require extensive policy change in service allocation while keeping current programs funded. Additionally, if the increased population cannot be incorporated into the domestic labor market, an informal market may be created or expanded, starving the government of revenue and leaving those engaged in informal work without legal redress of grievances against employers. Such members of society may become easily disaffected and engage in violent acts against the government.[34]

[34] See Auvinen (1997) and Walton (1998).

3.2.2.2 Age stratification

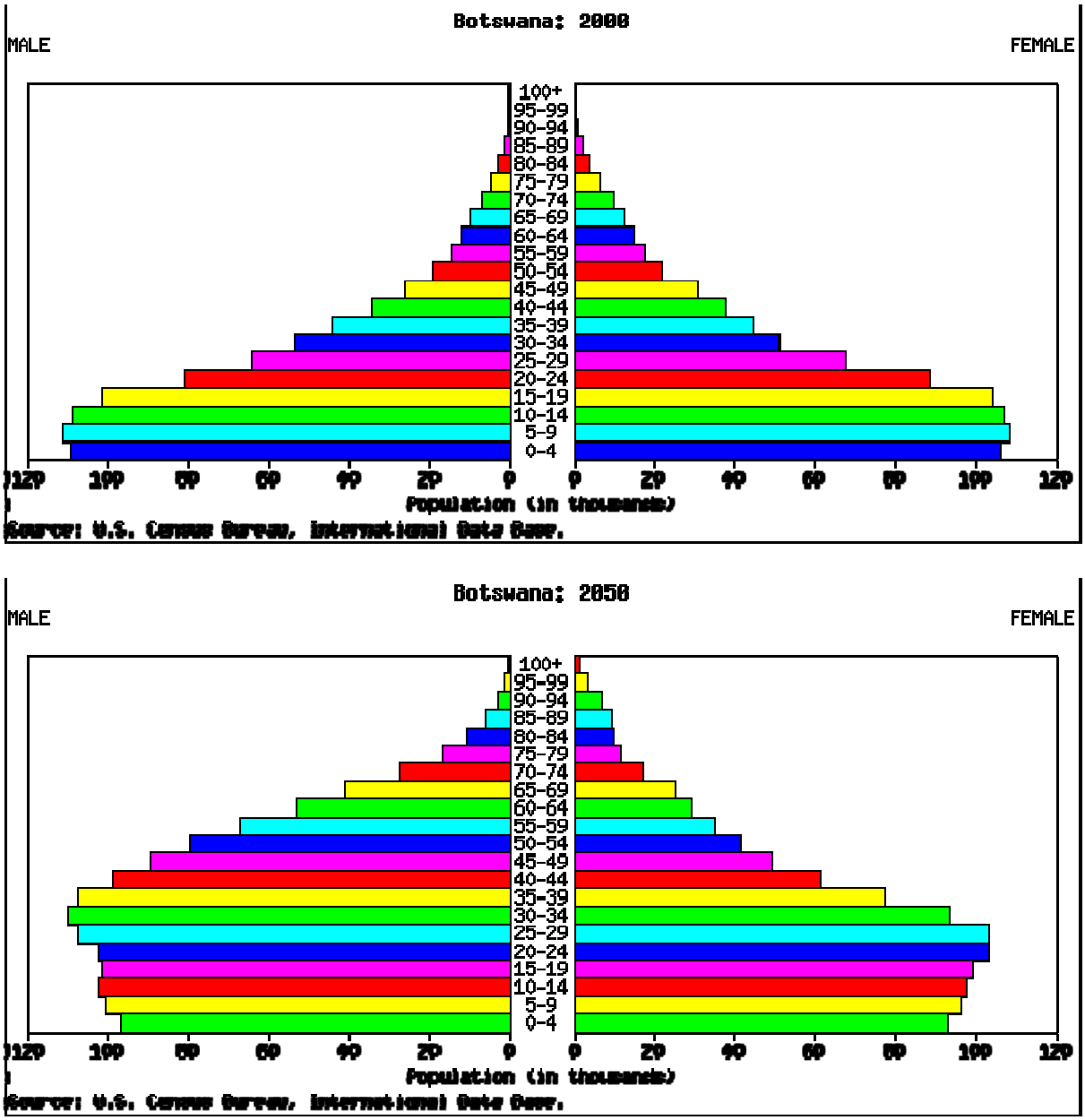

Figure 3.1. Age Pyramids of Botswana: 2000 and 2050 (projected)

Directly related to population growth is the age structure of society, which also differs greatly across countries. If growth rates are large due to an increase in births coupled with an improvement in mortality, many babies are born, and they are expected to survive infancy and grow to adulthood. As medical conditions improve, these large numbers of children, when they

reach child-bearing age, will have many children as well. If birth rates do not drop, larger and larger cohorts of children are born every generation. On the other hand, if birth rates do drop, as they have in the developed world, especially in Western Europe, and in countries like China which has instituted policies to reduce birth and growth rates, then the large numbers of children grow up, produce fewer children, and there are fewer and fewer young people to support the aging population. Figures 3.1 – 3.4 provide examples of some different age structure patterns throughout the world. Each figure includes age pyramids of the population in 2000 and the projected age structure for 2050.

Figure 3.1 illustrates the age pyramid for Botswana. Because of the large number of young people, the average age in Botswana has dropped over time. With such a wide base of the pyramid, high birth rates are projected to continue for many years, and in fact, looking at the projections for 2050, the base of the pyramid is expected to remain quite large. Japan's age structure in Figure 3.2 shows a very different picture, however. Birth rates are shrinking dramatically, and by 2050, the number of aged in society is projected to outnumber the young by a large margin. Unlike in Botswana, where education, immunization and jobs are a pressing concern, the Japanese government continues to search for ways to support the aging population and to keep economic growth strong with an expectation of a shrinking workforce.[35]

[35] Japan is very resistant to accept migrants to help fuel economic growth, so the government continues to invest in technology, including robot technology, to keep productivity high with a smaller workforce (Kathrin Hille, Amy Kazmin and David Pilling. "The New Melting Pot: Asia learns to cope with a rise in the flow of immigrants," *The Financial Times* (London Edition), 9 July 2007.).

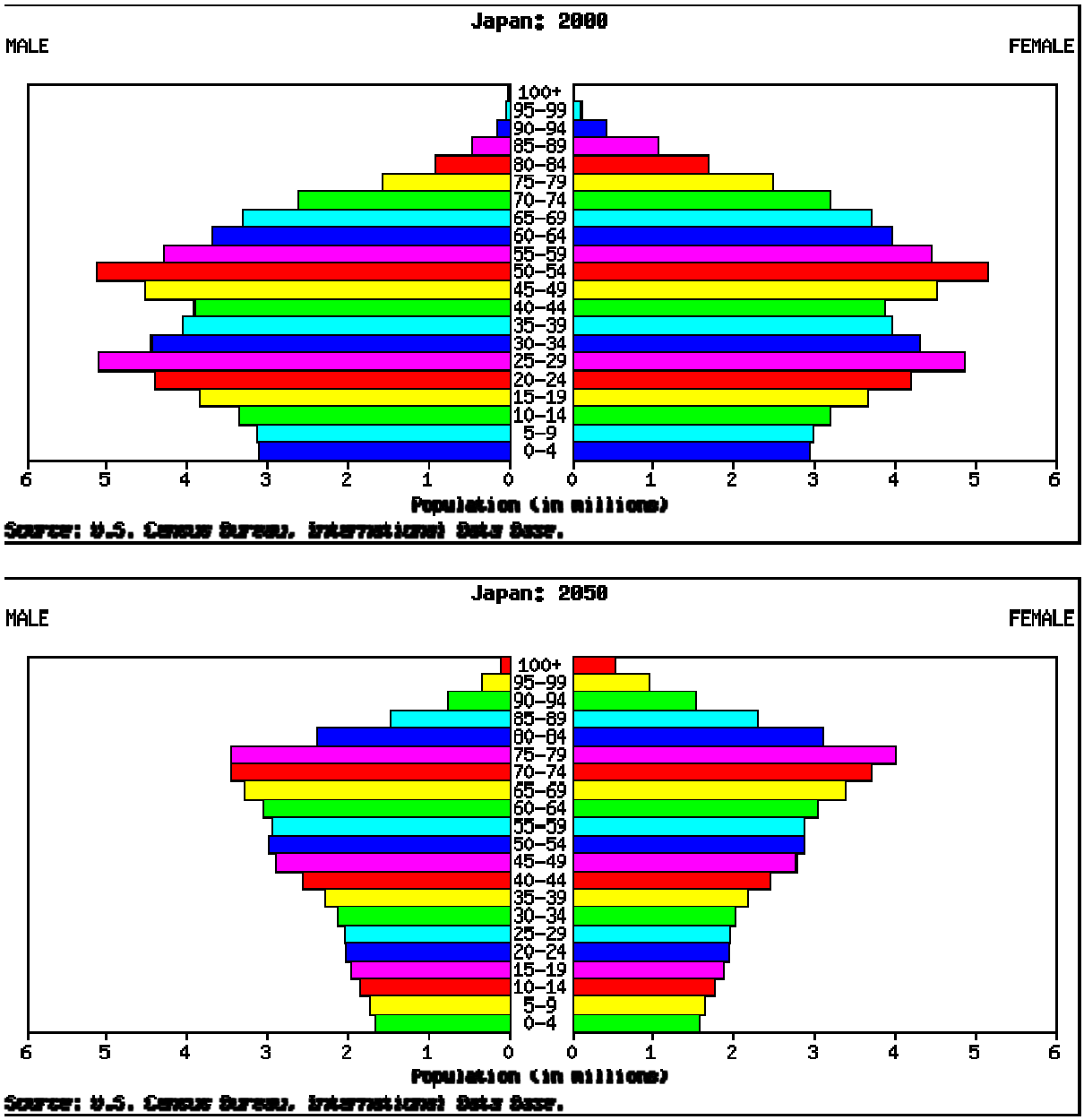

Figure 3.2. Age Pyramids of Japan: 2000 and 2050 (projected)

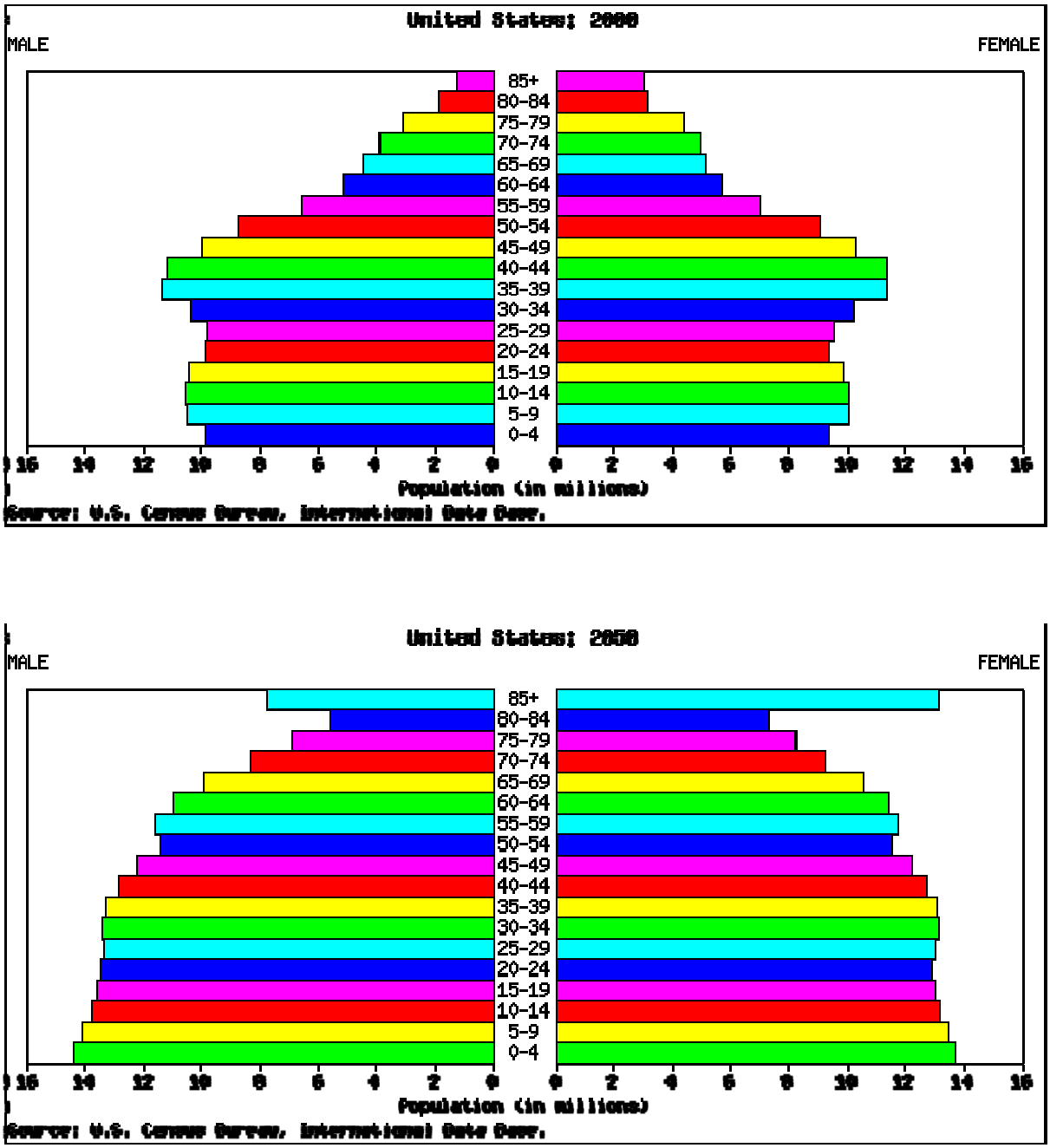

Figure 3.3. Age Pyramids of the United States: 2000 and 2050 (projected)

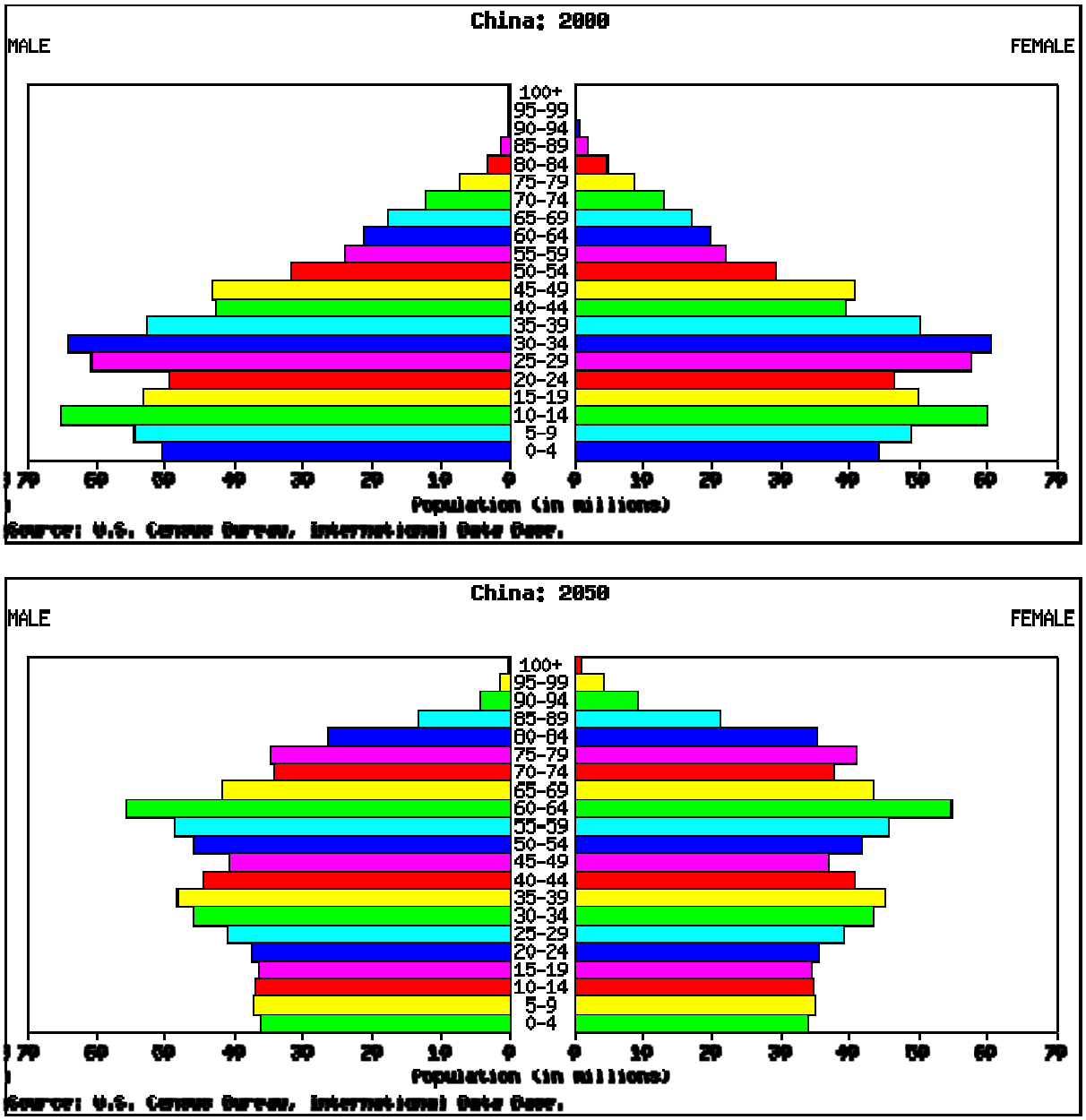

Figure 3.4. Age Pyramids of China: 2000 and 2050 (projected)

Figure 3.3 illustrates the age structure of the United States, which is very different from both Botswana's and Japan's pyramids. The United States, unlike most developed countries, is not experiencing a shrinking population, due to a large influx of immigrants whose birth rates

tend to be higher than native-born American women.[36] Because it does not have the large growth rates as is found in Botswana, the United States is not expected to experience an unsustainable growth in the youth population, and the US is also expected to escape the shrinking population of Japan because of the influx of workers from abroad. Therefore, because of replacement rate birth rates, the projected age pyramid for the United States in 2050 looks very similar to that of the pyramid in 2000.

Finally, China's pattern of age stratification, represented in Figure 3.4, illustrates how government policies, rather than economic development, can affect population growth. Though China's age pyramid had a very wide base in 2000, the expected effect of the One Child policy is seen in the projections for 2050: fewer children are being born and the society is aging. By the middle of this century, China's age stratification is anticipated to resemble Japan's more than Botswana's, and rather than struggle to care for young children, China may be searching for policies to assist an aging population with fewer workers to support them.[37]

With these examples in mind, I argue that the age stratification of a society has a large influence on how resources are allocated among the population. Large youth cohorts may strain the government's resources as health and immunization services are required for young children, as well as educational opportunities. Without such opportunities, young adults may not be equipped to acquire employment to sustain themselves and their families when they reach employment age. If sufficient education or employment is available, large numbers of youth can enhance production in a country and drive the economy toward robust growth. On the other

[36] High birth rates among immigrant women do not solely account for a US birth rate that is higher than other developed countries. American-born women, on average, have a higher birth rate than their European or Japanese counterparts (Camarota 2005).

[37] Though it may seem as if the One Child Policy has successfully addressed the problem of high birth rates and an exploding population, this policy has been strongly criticized both inside and outside of China and provides a strong caution for states that may consider legislating and criminalizing fertility. See "One-child policy sparks more rioting in Guangxi; Anger against birth control fines spreads across region," *South China Morning Post*, 31 May 2007.

hand, uneducated and unemployed youth can be an explosive influence in society. Youth are far more likely to engage in violent acts against the government than pensioners are, mainly because young people have far less access to positions of political power than older people do (Foner 1974) which increases their sense of powerlessness when airing their grievances. Thus, this potentially volatile group of citizens is a cause of great concern to governments attempting to maintain social peace. Additionally, Urdal (2006) argues that youth in a country are less tied to the community within a state than are older members of society because they are less likely to own homes or have children than older cohorts. This lack of community feeling reduces social impediments to internal domestic violence.

3.2.2.3 Urbanization

In addition to the size of the population, its location within the country can affect relations between the state and its society. While trends tend to differ in the industrialized versus developing worlds, urbanization can present challenges to governments in both contexts. In both contexts, however, the introduction of outsiders, whether from the countryside or other countries, increases competition for jobs, housing and services (Nagel and Olzak 1982). In the developing world, urbanization is a more recent development as countries have modernized, attracting rural workers away from the farms with the lure of regular work in the factories. In many Third World cities, urban areas have become overcrowded with the un- and under-employed, and in many cities, shantytowns and slums have cropped up on the outskirts of town. In places like Dharavi, on the outskirts of Mumbai, India, a thriving informal economy has risen within the slums, yet while employing a vast number of people, such a large concentration of people has created turmoil for the state. Very few of the services (potable water and electricity for starters) that reach Dharavi are provided directly by the state. In most instances, electricity is diverted

from the main grid illegally and affects provision to paying customers in other parts of the city. Water spigots are few, public toilets (which serve approximately 800 people per unit) are not free, and refuse is often dumped on the street, leaving a horrible smell.[38] What attracts people to such an environment, then?

> Life is grindingly hard for many rural Indians. Agriculture has recently been growing at only 2% a year, while the economy as a whole booms at over 8%. Crops fail, and many farmers are so deeply in debt that they are little more than bonded labourers. Suicide is common: in just one region of Maharashtra, the state of which Mumbai is the capital, 1,450 farmers killed themselves last year. In particular, many dalits, members of the lowest Hindu caste, see no hope of betterment amid the harsh conservatism of rural India. Their only hope is to move to the cities. It is an echo of what happened in medieval Europe, when moving to a city was for many an escape from serfdom.[39]

Similar situations exist in other Third World cities, such as in Kibera, a slum in Nairobi, Kenya. Like in Dharavi, living conditions are squalid and women, fearing being raped as they walk to the lavatories in the middle of the night, purge themselves into plastic bags that they then throw into the 'street', creating a living situation not to be envied. The Kenyan government does not recognize the existence of the slum, despite its presence in the center of the city, and many residents profess that they would prefer to live in the country; however, "Kenya's average rate of population growth for the past 30 years has been over 3% a year, putting enormous pressure on the land. With mouths to feed and no prospect of a job in the countryside, the rural poor head for the cities"[40] despite such terrible living conditions. In discussing urban social movements in the developing world, Walton (1998: 471) highlights how mobilization works in such environments:

> Material welfare is uppermost in the intentions of migrant and rapidly urbanizing populations. In the cities of developing societies, large segments of the population experience chronic poverty with limited (geographical and intergenerational rather than individual) mobility opportunities. To the extent that these groups are absorbed into the urban economy, it is principally through the underemployed informal tertiary sector

[38] "A flourishing slum; Urban poverty in India," *Economist* (US edition), 22 December 2007.
[39] "The strange allure of the slums," *Economist* (US edition), 5 May 2007.
[40] Ibid.

> where protest organizations (e.g. trade unions) and repertoires (e.g. strikes) are in the main not present. Neighborhoods and communities are the more common locus of mobilized action and urban services are the currency of political exchange – public goods such as water, electricity and transportation that improve the material condition of households by reducing their expenditures.

While not to the same degree, substandard living conditions due to urban concentration can also be found in the developed world. In cities such as Paris, France, immigrants and minorities tend to reside in densely populated areas directly outside the cities known as *banlieues* ('outskirts'). Public housing in these areas tends to be of poor quality, and unemployment is rife. In October 2005 these *banlieues* erupted with violence and destruction as second- and third generation immigrants rioted in the streets. These riots highlighted the need for better employment programs by the government, as the perpetrators of the violence were predominantly (though not exclusively) unemployed Muslim young men. In fact, unemployment in France at that time was 10%, youth unemployment was roughly 20% (a European high), and unemployment in the *banlieues* among Muslim youth hovered in the vicinity of 50%. Though the riots were sparked by the death of two youths who thought they were fleeing the police, the reason the riots spread and persisted "surely lies in the toxic mix of poor housing, bad schools, inadequate transport, social exclusion, disaffection among Muslims who are discriminated against—and, above all, in mass unemployment."[41]

Many scholars have explored the reasons why cities are attractive locations for mobilizing against the government. Because communication is more difficult among a population that is spread out, Auvinen (1997) argues that overall, the majority of incidents of political conflict are likely to take place in the cities, rather than the countryside.[42] Additionally,

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[41] "France's failure – Of riots and failure" *The Economist* 12 November 2005.

[42] Auvinen (1997) does concede that most civil wars in the developing world have occurred in rural areas, despite more instances of civil conflict at lower levels occurring in the cities. This project assesses a wide range of violent

he asserts that most urban residents, especially those employed informally and struggling to maintain themselves and their families, are not represented by the political establishment, and must therefore, seek non-official channels through which to express their grievances. In developed countries, as well, it is often immigrants and the poor who cluster in cities, and are under-represented politically. Finally, urban poor in wealthy societies may be more aware than their counterparts in the developing world of the disparity in living conditions between themselves and other, more affluent urban dwellers. This may feed into an enhanced sense of relative deprivation, a factor cited as a cause of political violence (see Gurr 1970).

3.2.2.4 Population density

In addition to the concentration of people in the cities, the ratio of people to total land mass is an important factor in considering the stability of the relationship between the state and society. Geographically small states tend to be more crowded than larger states, even if they do not have as large a population. In such states, land may be converted away from agricultural production and toward more efficient use of the land. While many states can purchase needed food from other countries, lack of self-sufficiency makes such states dependent on commodity prices and the willingness of other countries to sell products to them. Additionally, the proximity of societal groups in a densely populated country may exacerbate competition for resources and provide opportunity for violent action.[43] Historically, population density has been

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civil conflicts and is not limited only to civil wars. In fact, civil wars are less frequent than lower levels of civil violence, and therefore, it is important to account for a factor that is associated with civil violence, even if not the most extreme form.

[43] A proximity explanation of conflict was popularized in the inter-state conflict literature when it was shown that states that share borders or are closely contiguous have a higher probability of engaging in militarized disputes than are states which are not close to each other due to the opportunity for conflict. I borrow this logic to suggest that locating people in close proximity within a country may increase their interactions, possibly increasing friction

cited as a justification for major power expansion, first through colonial expansion, and perhaps most notoriously, in Nazi Germany's desire to conquer and absorb its neighbors to provide *Liebensraum*, or living space, to its citizens (Kruszewski 1940).

The territorial boundaries of most countries have remained constant for a considerable amount of time. Exceptions, of course, include the emergence of new states from the collapse of the Soviet Union and Yugoslavia and successful separatist movements in Ethiopia (Eritrea) and Indonesia (East Timor), among others. However, for the majority of states in the international system, boundaries are predominantly fixed, even if the border is disputed (Hensel 2001). For this reason, the density of a country changes when the population changes, either through natural growth rates or through immigration, as the area of the country tends to remain fixed. Thus, if the population of the country increases, it becomes more densely populated and more people live in and compete for the same land and resources. As when people are crowded into cities, issues of sanitation, potable water provision, and energy management concern the government when the state becomes more densely populated. This concern may be exacerbated if the state's population is made up of ethnically, linguistically, or religiously diverse groups. Competition for resources by such groups living in close proximity to each other might exert a destabilizing influence on the state.

3.2.2.5 Refugees

Another circumstance that adversely affects a state's ability to adapt to demographic shifts occurs with large-scale movements of people cross borders. Choucri and North (1989) highlight the tensions that emerge between states when a push-pull dynamic exists. Groups of

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among them, especially if they must compete over scarce resources. See Vasquez (1995) for various explanations for why contiguity might be associated with inter-state conflict.

people are often pushed out of their home state for a variety of economic or political reasons and are pulled into the recipient region because of job opportunities or similar cultural settings. Often, there is a subsequent 'push back' from the recipient state to the home state that can often lead to conflict.

Beyond emigrants, which add or subtract from a state's population growth rate, massive influxes of refugees from neighboring countries can also destabilize states.[44] Leroy (1986: 174) suggests that refugees flee across national borders because of environmental degradation, domestic political turmoil, or war. Refugees create intense strains on a state's financial resources because they require a great deal of assistance while contributing little, if anything, to the national economy. Some states are less equipped than others to deal with these strains, and the relations between the state accepting the refugees (host) and the state from which they fled (home) is likely to suffer as a result. If the refugees fled from a war situation, the inward focus of the home country may give rise to external rivals, who are willing to exploit the domestic weakness of the home state for their own ends.

Lischer (2005) also details how refugee camps in host countries can be used as areas where militants attempt to regain strength before engaging in cross-border attacks against enemies in the home country. Not only does this constitute a threat to the home state, but it can also prove to be destabilizing for the host country, which is not likely to welcome armed militants within its borders. Perceiving host countries as aiding and abetting the enemy may

[44] Refugees are very different than asylum-seekers who attempt to remain in a host country permanently due to an inability (usually for political reasons) to return to their home countries. Refugees, on the other hand, flee their home country due to imminent danger caused by war or natural disasters, but they seek to return to their homes as soon as it is safe to do so. One group that I do not discuss in this chapter are internally displaced persons (IDPs), who must leave their home for political or environmental reasons and become *de facto* refugees within their own states. I do not consider this group specifically because IDPs are typically *the result* of a breakdown of state-society relations, not the cause. Granted, the locations which house IDPs may experience the same strains as discussed below with those communities that house external refugees, so it is important not to ignore IDPs completely, but in the interest of simplicity, I do not consider them in this analysis.

incite home countries to consider military action against the host country, and such a threat gives the host country increased incentive to push out the refugees, endangering the lives of both former combatants and innocent civilians. This mutual mistrust and security dilemma-like behavior may be problematic for both states, especially if military mobilization diverts resources away from their needy societies to border security, potentially exacerbating the circumstances which led the refugees initially to flee.[45]

This description accurately reflects the situation that existed in Rwanda after the 1994 genocide of Tutsis and moderate Hutus. Former members of the Hutu national army fled into neighboring Democratic Republic of Congo (DRC) and staged armed attacks against the new Tutsi-dominated Rwandan government from the refugee camps. The insecurity on their border led Rwanda to invade the DRC in 1997, overthrow the sitting leader (Mobutu) and install another who promised to address the security situation on the border (Kabila). Instead, however, Kabila engaged in a repression campaign against Congolese Tutsis which sent them fleeing into Rwanda seeking aid and protection. This flow of refugees, as well as the presence of Hutu militants in refugee camps in the DRC, led Rwanda to invade the DRC again in 1998, a military campaign that was not successful in either overthrowing Kabila or permanently settling the problem of insurgents within the refugee camps.[46]

Refugees constitute a segment of the population that is not usually integrated into the larger society. They are 'guests' of the host communities and are almost solely reliant on the goods and services provided by the host state and some international actors, but they very rarely contribute to the economy of the host state, leading them to drain the resources of the host

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[45] See Judith Matloff. "Suddenly, Africa's Conflicts Aren't So Local," *Christian Science Monitor*, 7 February 1997.
[46] See Olsson and Fors (2004), Shearer (1999), and Reyntjens (1999) for thorough descriptions of this complicated relationship between Rwanda and the DRC.

government. Jacobsen (1996: 667) argues that refugees "can impose strains on medical, educational and municipal facilities, on housing capacity, and on job availability. These strains frequently result in service breakdowns, increased hardship for local people, and local resentment towards refugees." Refugees often congregate near the border of the country from which they fled, and, as seen in the Central African Republic and Chad, where refugees from Darfur, Sudan have fled,[47] the camps that form lack basic services such as potable water, sufficient food and adequate medical supplies. These services must be supplied by the host government if international supplies run short, or the host country may face an extreme humanitarian crisis within its borders. To negate the humanitarian effects to a refugee population, the host government may need to divert resources from its citizens to the refugee populations. If such diversion of resources is substantial, the local population may object, straining the relationship with the government.

Two factors may complicate or alleviate the strain between the government and society caused by hosting refugee populations. The first factor, ethnicity, may complicate matters if the ethnicity of the refugees is different than the local population playing host to them. Diversion of resources to different (and perhaps rival) groups may lead societal groups to object more quickly and more loudly than if the refugee group is from a similar ethnic background.[48] The second factor, size of the refugee population, will affect the amount of resources that need to be diverted. If the refugee population is small, a small diversion of resources may result in simple

[47] Linda Polgreen, "Refugee Crisis Grows as Darfur War Crosses a Border," *New York Times* 28 February 2006.
[48] Indeed, if the refugees are of the same ethnic group, the local population may *demand* that the government help their kin. While I do not account for the ethnic similarity between refugees and the population of the host state in this analysis, such analysis would add richness to our understanding of the impact of refugees on conflict participation. Unfortunately, this analysis will have to wait for a future project.

belt-tightening by the local population. A large refugee population, and a large outlay of resources toward them, is expected to lead to a more vocal response from the local population.

3.3 WHEN BREAKDOWN LEADS TO CONFLICT

> Too many people in a country create a sense of angst in society, as individuals and groups compete for every conceivable good. The extent of scarcity varies from country to country, but in the more hard-pressed countries, burgeoning demands will keep governments off balance and will incline them to resort to repression. Growing populations absorb any economic growth rate that may occur, thus frustrating governments' efforts. Many countries, especially in the Third World, have a disproportionately large number of youth whose needs are great, and yet these restive youths have a small stake in the incumbent order of things. Urbanization, again especially in the Third World, results in millions being concentrated in the misery of slums, but the cities still provide opportunities for the mobilization of the unemployed and disaffected to make demands on government. Growth in numbers also exacerbates the almost ubiquitous problem of ethnic conflict, as when an increase in the size of an ethnic group leads to a demand for a larger share of society's political and economic rewards. Finally, overpopulation can cause environmental deterioration that, in turn, harms the economy and weakens the government's capacity to meet human needs.[49]

While previous sections of this chapter have focused on what demographic pressure is and how it can strain the political relationship between the state and society, this section focuses on what states and societies do when this relationship is strained or threatened. Because the main focus of this dissertation is to determine the extent to which demographic pressure leads to lethal military conflict, I will focus most heavily on why a state or societal group might engage in militarized conflict. However, military conflict is one option among many, made more probable under some conditions and less probable under other conditions. Thus, in addition to forwarding two main hypotheses about the impact of demographic pressure on conflict behavior, I will also

[49] Henderson 1993: 324.

propose additional hypotheses that attempt to refine the conditions under which demographic pressure may lead to inter- or intra-state conflict.

3.3.1 Societies' motivations for intra-state conflict

In most studies of civil conflict, scholars typically promote one of two popular motives for civil conflict: (1) greed, when groups attempt to gain control of the revenue of the state, frequently in the form of lootable resources; and (2) grievance, when disaffected groups attempt either to wrest control of the government from an unsympathetic privileged group or to separate from the state and create a new territory which they can govern. 'Greed' or opportunity explanations of conflict focus on the economic benefits to the rebel group if its rebellion is successful and the tools employed by the rebel elite to motivate regular citizens to participate in the struggle (Collier and Hoeffler 2004, Regan and Norton 2005). Success may include winning the military contest or forcing the government to accept concessions to the financial benefit of the rebels (Regan and Norton 2005). Frequently the control of a natural or mineral resource (oil, diamonds and other gems, or opiates) is the source of the conflict. These factors may provide the opportunity for rebels to conduct violent military action against the state, especially if lootable resources have been acquired by the rebels to fund the violence against the state.[50]

On the other hand, this opportunity is not sufficient to convince the rest of society to follow rebel leaders' plans against the state. Thus, 'grievance' or motivation/willingness explanations are cited as giving the regular population the incentive to engage in civil conflict.[51] Grievance explanations tend to focus on inequality, political oppression and scarcity or unjust

[50] See de Soysa (2002a, 2002b), Kahl (2006), Lujala, Gleditsch and Gilmore (2005), and Ross (2004).
[51] See Starr (1994) and Most and Starr (1989) for a discussion of opportunity and willingness.

distribution of resources as the causes of popular discontent (Korf 2005, Besancon 2005, Ellingsen 2000, and Gurr 1970). When these factors are present in societies, the population may be more easily mobilized against a state whose policies perpetuate undesirable living conditions.

When a state is experiencing demographic pressure, some societal groups may experience reduced service provision more keenly than others, increasing the grievances felt by that group. Societal groups faced with declining service and goods provision want to ensure that the dwindling resources are available to their group and thus, groups with grievances may attempt to capture the goods and revenue of the state or form their own state in which they can control the distribution of public goods. Homer-Dixon (1991: 79) suggests that an increasing population more rapidly consumes the resources of the state, leading to environmental degradation which further reduces the supply of resources available to the population: ". . .as human population grows and environmental damage progresses, policymakers will have less and less capacity to intervene to keep this damage from producing serious social disruption, including conflict." In their summary of the work of the Toronto Group,[52] Gleditsch and Urdal (2002) discuss how Homer-Dixon and others adopted Gurr's (1970) notion of relative deprivation to explain how such resource shortages could lead to civil conflict. While I do not argue that shifting consumption patterns due to a changing population necessarily leads to environmental degradation, I concur that a change in consumption for both public and private goods may strain the government's ability to adapt. As groups observe their declining benefits, they evaluate their position compared to other groups, or to their status in previous time periods, and if they

[52] The 'Toronto Group' was the name given to those scholars who emerged from the University of Toronto's Project on Environment, Population and Security, headed by Thomas Homer-Dixon. The work of this Project provided the foundational literature for the recent study of the links between environment, population and conflict.

consider themselves worse off in the present period, their feeling of relative deprivation may be acute.

This chapter has argued that demographic pressure affects the size and distribution of the population, and as the population shifts, so also do popular demands on the government. Feelings of deprivation lead groups to increase demands on the government to provided needed goods and services. If the government responds to the needs of societal groups, there is no incentive for society to take action against the state. In fact, a satisfactory response to their shifting demands may increase their support for the government. An inadequate response, however, might lead disaffected groups within society to protest against the government, even to the point of violence. Because demographic pressure also limits the revenue available to the state to meet societal demand, the ability of the state to respond in times of demographic pressure may be severely curtailed. Regarding demographic pressure and civil conflict, then, all things being equal, states facing demographic pressure are more likely to experience civil conflict than are states without such pressure. Therefore, I begin with my main hypothesis linking demographic pressure and civil conflict:

H1: Demographic pressure increases the likelihood of civil conflict within a state.

Demographic pressure, primarily a source of domestic grievance, is not expected to impact all states in a similar manner, however. Evidence in the growing literature on civil conflict has indicated that certain conditions such as a state's level of development, regime type and ethnic composition are important predictors of civil conflict behavior. In addition to controlling for these factors in the test of H1, I also assess whether these factors condition the impact of demographic pressure on civil conflict. Does an under-developed country without demographic pressure have a significantly lower probability of experiencing a dispute than a

state with a similar economic profile that is experiencing demographic pressure, and if so, how much lower? Does demographic pressure affect different types of regimes in different ways regarding their likelihood for civil conflict? Does demographic pressure have a greater impact in states with social cleavages? These questions, refinements of the general assertion that demographic pressure is expected to increase the likelihood of civil conflict, lead to conditional hypotheses, detailed below.

The first state attribute I assess, state wealth, captures an economic incentive for civil conflict and impacts the opportunity for conflict within a country. As motivation (grievance) and opportunity (greed) are both expected to be necessary conditions for violent conflict, the impact of demographic pressure should depend on the wealth of the state. In fact, Collier and Hoeffler (2004) suggest that greed and grievance explanations are not mutually exclusive in explaining civil conflict. Thus, if a state is wealthy due to trade or other economic factors, it might make a ripe target for rebels; however, the population in unlikely to have an incentive to wrest away control of the government or specific territory if they are economically satisfied. In poor agricultural countries, Collier and Hoeffler (2004) argue, the opportunity cost of rebellion is very low, since most potential rebels are unlikely to be employed in a high wage job that they would be reluctant to leave to join the rebellion. Additionally, Fearon and Laitin (2003) suggest that the wealth of the state is an acceptable proxy for the administrative capability of a state, with less wealthy countries exhibiting weak state institutions while wealthier countries tend to have a stronger state apparatus, which would deter rebellion or secession.

These arguments suggest that as a state's wealth increases, the likelihood of civil conflict is expected to decrease. Because wealthy states are those states that are most able to adapt to shifts in their demographic profile, they are not expected to experience demographic pressure to

the extent that less wealthy states are. If they do happen to experience demographic pressure, access to international credit, or the ability to deficit spend without devastating consequences will enable them to avoid a drastic decline in public goods provision. In under-developed states, on the other hand, demographic pressure is expected to exacerbate the challenges of lack of development and weak state institutions and substantially increase the likelihood of civil conflict. Therefore, the following hypothesis will be tested.

> H2: The impact of demographic pressure on civil conflict is expected to decrease as a state's wealth increases.

While the previous hypothesis focused primarily on the economic (dis)incentives or opportunity of the population to rebel against the government, the second factor on which the impact of demographic pressure may be conditioned is the regime type of the government and may represent both opportunity and motivation for potential rebels. On the opportunity side, a state with democratic features allows citizens to organize legally, which may enable potential rebels to plan their rebellion or secession within legal groups. In states lacking democratic features, however, governments can prevent the organization of political opposition, which would be expected to hamper the rebels' ability to mobilize and recruit for their action against the government. In terms of motivation, or willingness, for civil violence, the expectations are reversed. In democracies, opposition members are able to redress the government for any grievances they might have through institutional channels, and their incentive for rebellion is greatly reduced, despite their ability to organize. The lack of freedom and access to government in autocracies creates many grievances, especially for those who are excluded from the government (Mousseau 2001).

Given the previous discussion, the relationship between regime type and civil conflict is expected to be non-linear.[53] It is those states that mix features of both autocracies and democracies that are at most risk for civil violence. These states, known as anocracies, allow for some levels of political participation, but as they are not fully democratic, opposition groups still face considerable barriers to full participation in the political process which may prohibit them from having their grievances addressed. Additionally, anocracies tend not to have the same repressive capacities at their disposal as autocracies do, which prevents them from stymieing nascent protests. This argument suggests that the relationship between regime type and civil conflict is non-linear; democracies and autocracies are expected to have a lower likelihood of civil conflict than are regimes with a mixture of democratic and autocratic features (Hegre et al. 2001).

Demographic pressure is not expected to change the fundamental nature of this inverted-U shaped relationship between regime type and civil conflict (as democracy increases so does the likelihood of civil conflict until some level of mixed regime when continued increases in democracy will decrease the likelihood of civil conflict). Demographic pressure is expected to augment the problem anocracies face by heightening the grievances of the population. The population of such countries should be able to organize and protest any curtailment of public goods provision, and the state will not have extensive repressive capacities available to prevent such organizing. However, because the institutions of the state are closed to non-supporters of the sitting government, peaceful action is unlikely to force change in government policy. Because regime type impacts opportunity for conflict, and demographic pressure captures

[53] See also Muller and Weede (1990).

potential grievances within the population, the impact of demographic pressure is expected to be conditioned on a state's regime type.

> H3: The impact of demographic pressure on the incidence of civil conflict increases as a state's level of democracy increases from very autocratic then decreases once it achieves a higher level of democracy.

The third factor on which the impact of demographic pressure may be conditioned is the amount of social cleavage existing in the country. There is a richly developed literature in the study of American and European politics that discusses the role of cleavages in electoral party politics.[54] The assumption of all these studies is that how a society divides itself politically has direct consequences for political conflict, whether this conflict is peaceful or otherwise (Zuckerman 1975). Indeed, Zuckerman (1975: 238) claims that "cleavage-membership perceptions that are highly intense will result in a polarized cleavage system and thereby in violent political conflict." Most of this literature focuses on party systems within democracies and how political divisions among the population become politicized and opposing groups are mobilized. This mobilization tends to be of the peaceful variety, and because these opposing groups are functioning within democracies, typically conflict resolution occurs before lethal violence is employed. Because many countries are not democratic or only partially democratic, however, it is not particularly useful to adopt the party politics conception of social cleavages, many studies of which focus mainly on economic cleavages (labor versus capital) for the present analysis. Instead, I choose to focus on those divisions that deal with identity issues within the population. Fearon and Laitin (2003) identified three dimensions along which identity/social cleavages could form in a country: ethnic, linguistic and religious. Political mobilization on ethnic, religious, or linguistic lines may occur when there is a competitive advantage to be so

[54] See Lipset and Rokkan (1967), Daalder (1966), and Dahl (1965) for examples of the foundational literature.

associated, such as when competition for resources is structures along such lines (Nagel and Olzak 1982).

Therefore, social cleavages may represent both paths to conflict: opportunity and willingness. On the opportunity side, social cleavages may either prevent or encourage mobilization, depending on the size of the contending groups. Regarding willingness, cleavages may proxy grievances within a country. Demographic pressure is expected to exacerbate any pre-existing tensions caused by social divisions within a country. In states where the population is divided along ethnic, linguistic, or religious lines, if demographic pressure affects some groups more strongly than others, grievances may become extreme and highly politicized. These problems may be especially acute if the government is comprised mostly of one group to the exclusion of others. The extensive violence in Rwanda throughout the 1990s, including a genocide that killed approximately 800,000 Rwandans, was primarily a struggle between the majority Hutus and minority Tutsis regarding which group would control the government and the allocation of public goods (Olsson and Fors 2004). A recent example of ethnic conflict is the violence that broke out in the aftermath of Kenyan elections in late 2007.[55] Linguistic differences in Spain between the Castilians (Spanish) and both the Catalans (Catalán) and the Basques (Euskera) have lead to calls for autonomy or separation of the minority groups, at times resulting in lethal political violence (Shabad and Gunther 1982). Linguistic concerns have also been cited as motivations for a break-up of Belgium.[56] Religious divisions, on the other hand, are more frequently cited in conflicts in the Middle East (Israel/Palestine, modern Iraq) and

[55] Barney Jopson, "Kenya erupts as Kibaki named victor," *Financial Times* (Europe edition) 31 December 2007, p. 3; Barney Jopson and William Wallace, "Mob violence drives fear of spreading ethnic conflict," *Financial Times* (Asia edition) 3 January 2008, p. 2.
[56] "Time to call it a day," *Economist* (US edition) 8 September 2007; Elaine Sciolino, "Belgian, Adrift and Split, Sense a Nation Fading," *New York Times* (Late edition) 21 September 2007, p. 4.

Northern Ireland. Chhibber and Petrocik (1989: 192, *emphasis in original*) indicate how violence broke out on all three dimensions in India in the same year:

> During 1986-87, for instance, *religion* provided a basis for the struggle of the Sikhs in Punjab; in Uttar Pradesh the Hindu claim to a temple within a mosque sparked widespread Hindu-Muslim riots. Violence erupted over the status of the Konkani *language* in Goa, and Tamilnadu experienced a re-emergence of anti-Hindi agitation. *Ethnic* identity helped fuel the Tripura, Naga and Mizo insurrections and the Gorkha demand for a separate state.

The impact of some social cleavages on civil conflict is not expected to be linear. For states with no cleavages due to a homogenous culture (i.e., Japan), demographic pressure has no cleavage to magnify. Somewhat similarly, the impact of demographic pressure should not be magnified in pluralistic societies with a great deal of heterogeneity (i.e., United States). In such societies, public goods are not distributed along identity-based lines, removing a powerful incentive for such differences to lead to competition among groups. In her study of ethnic mobilization, Olzak (1983: 368) lists a litany of government services over which ethnic groups compete in societies that are split along ethnic lines, including education, housing, welfare, and taxation. Those societies that fall in the middle of the homogenous/heterogeneous spectrum may experience an amplified impact of demographic pressure because they are the most likely states to struggle to balance these cleavages.[57]

While the previous discussion focused on the justification for a non-linear relationship between religious and ethnic fractionalization and civil conflict based on grievance explanations, Elbadawi and Sambanis (2002: 311-312) also suggest that this non-linear relationship is due to opportunity arguments as well. In their study of civil war prevalence, including both onset and

[57] There are a few states like India and Papua New Guinea in which there are an extreme number of languages or ethnic groups, respectively. In these states fractionalization exceeds that in heterogeneous states such as the United States, and a great deal of friction is possible among the groups there. Outliers like these must be kept in mind when performing the analysis in Chapter 5.

subsequent years of fighting, they suggest that "[e]thnic fragmentation should be significantly and nonlinearly associated with civil war prevalence. Both high and low levels of fractionalization should reduce the prevalence of civil war by making it harder to coordinate the initiation of new wars while increasing the prevalence of civil war by extending the duration of wars that do start."

Putting these arguments together, at low levels of fractionalization, there may not be sufficient grievances within societal groups to incite domestic political violence, while at high levels of fractionalization, mobilization becomes more difficult to accomplish as collective action problems increase. Thus, both ethnic and religious fractionalization are expected to have a non-linear relationship to civil conflict. Languages, on the other hand, tend to disrupt the ability of the government to communicate with the people as well as provide services such as education, and the more languages spoken in the country, the larger this problem is. Therefore, the number of languages in a country is expected to have a linear relationship with civil conflict. Because demographic pressure, a proxy for grievances, is expected to augment the grievances caused by social cleavages but not solve any collective action problem that groups have, the relationship between each cleavage measure and civil conflict is *not* expected to change in shape but simply "shift up". For example, if the number of languages is positively associated with civil conflict, the interaction of demographic pressure and number of languages should also be positive.

From the preceding discussion, three final hypotheses can be forwarded.

H4a: The impact of demographic pressure on the occurrence of civil conflict increases as ethnic fractionalization increases then decreases as diversity increases.

H4b: The impact of demographic pressure, conditioned on the number of languages spoken in a country, is expected to increase as the number of languages increases.

H4c: The impact of demographic pressure on the occurrence of civil conflict increases as religious fractionalization increases then decreases as diversity increases.

The hypotheses forwarded in this section will be tested empirically in Chapter 5.

3.3.2 States' motivations for inter-state conflict initiation

Demographic changes, under some conditions, strain the resources a state has available to provide for the demands of society. Starr (1994: 486, *emphasis in original*), in reference to states' motivations for political violence, explains, "In order to respond to the demands placed on the government, or the political system of the state, the government requires resources. These resources provide the 'opportunity' or the *possibility* of certain kinds of behavior" including internal repression or external military conflict. States experiencing demographic pressure may find themselves in quite a precarious position, then. Internal grievances which may arise as a result of demographic pressure can serve to mobilize the domestic population (as seen in Chapter 5), and suppression of dissenting groups, though a potentially attractive option, especially to autocratic states, may further exacerbate the grievances of the people. On the other hand, external efforts to acquire resources may present an expensive and risky strategy. Starr (1994: 496) supports this argument claiming, "Governments require resources in order to exercise authority and/or protect authority, and to do so legitimately by satisfying the demands of society. The internal extraction of resources may provoke opposition in a variety of ways; external extraction leads to 'intersections' with other states seeking resources."

I have previously suggested that demographic pressure disrupts the mutually beneficial relationship between the state and society. Such disruption creates increased demand on the government to respond in the form of new or enhanced goods and services. As state leaders wish

to remain in power as long as possible, and replacement by their people is an outcome they seek to avoid, states balance the amount of rents they collect against the amount of competition they face both internally and externally to protect against popular uprisings (North 1981: 28; Bueno de Mesquita et al. 2005). If the state cannot accommodate popular demand with present resources, it searches for options that will prevent the society from attempting to replace the government. As one of the government's main goals is to keep the peace domestically, internal options for resource extraction may not be feasible without further alienating the domestic population. Thus, states may entertain the prospect of outward extension, including initiating inter-state conflict, to gain access to needed resources. Through territorial expansion, resource seizure, or the policy or regime change in a state that is unfriendly to them, states may mitigate the impact of the economic or environmental damage resulting from demographic pressure and maintain internal control.

Assuming that a state would succeed at an inter-state conflict it initiated, resource seizure or territorial expansion may at first seem to be the most effective way of dealing with the problems associated with demographic pressure; however, territorial conquest requires protecting and policing the newly acquired territory, as well as subduing the residents of that territory. Such a large scale operation would also require a great amount of resources to accomplish, a feat that is expected to be difficult in a period of demographic pressure and resource constriction. Regime or policy change in another state, then, might serve as a less intensive way in which to acquire needed resources. For example, a state would probably prefer to gain access to resources, as Uganda and Rwanda did during its 1998 war with the Democratic Republic of

Congo, without having to pacify the entire territory of the opposing state.[58] In this case, Rwanda's professed aim was to remove Laurent Kabila from power in the DRC because he failed to solved the security problems on Rwanda's border which were threatening the stability of the Rwandan government; however, during the course of the war, Rwanda, and it's ally Uganda, were able to exploit the DRC's rich supply of coltan to fund both the war and domestic spending (Olsson and Fors 2004).

An outward focus of states to solve internal domestic problems is consistent with *lateral pressure* accounts of conflict (Choucri and North 1975, 1989). Lateral pressure is "extension of a country's behavior and interests outside of its territorial boundaries (and, in some circumstances, the extension of the boundaries themselves)" (Choucri and North 1989: 289). Fundamentally, this outward extension by one state, according to lateral pressure explanations, is based on internal demands placed on the state by society and the state's ability to respond to those demands. States with greater capabilities (in terms of economic wealth and military capabilities) are expected to respond to societal demands in an assertive manner, and encounters with weaker states will result in exploitative relationships or territorial seizure (Choucri and North 1989: 296).

This leads to a first testable hypothesis linking demographic pressure and inter-state conflict. States facing demographic pressure need to respond to the increased demands of society so as to forestall domestic unrest and are, therefore, more likely to initiate military action against other countries in order to acquire the resources they need domestically.

> H5: States experiencing demographic pressure are more likely to initiate inter-state military conflict than are states not experiencing demographic pressure.

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[58] States would also probably prefer to supplement their internal resources without engaging in military conflict at all. Later in this chapter, I will discuss more peaceful options that states may pursue when experiencing demographic pressure.

Choucri and North (1975: 15) outline some of the factors that impact the ability of states to engage in external military action:

> A society (especially one with a growing population) with insufficient resources within its own territory will be seriously constrained in its activities unless it finds some way of acquiring the resources it demands. Whether and how a society reaches for resources beyond its sovereignty is conditioned by location, level of population, level of technology, and the resources, technology, needs, power, and friendliness of neighboring states.

While I will return to and control for many of these factors in my empirical model of inter-state conflict in Chapter 6, it is important to focus briefly on a few characteristics of states that may affect their propensity for dispute initiation and provide a more nuanced understanding of the conditions under which demographic pressure leads to external military conflict.

Lateral pressure accounts of inter-state interaction allow for other ways besides military conflict for a state to extend itself outside its borders. Other options include cross-border trade or alliance formation. Increasing trade or forming alliances may not provide feasible or desirable alternatives, however, if exportable goods are not being produced or are needed domestically, or if the neighboring states do not share similar strategic interests in the region or internationally. Additionally, these options cannot often be implemented quickly. Increasing incentives for trade frequently requires legislation, purchasing food or other necessities requires money that the government may not have, and generating formal military commitments with foreign countries is typically a painstaking process which frequently requires legislative approval. However, these options may prove to be more attractive than military conflict. Trade brings goods into the country, and alliances may allow the government to shift spending away from defense toward domestic spending. Increasing trade and creating alliances could serve as policy substitutes for

military conflict:[59] however, without a formal model of foreign policy choices, I cannot specify when a state would choose one strategy over another. Instead, in my model of inter-state conflict (see Chapter 6), I control for trade and alliance membership as a means of accounting for these other options available to states.

H5 suggested that demographic pressure increases a state's likelihood of inter-state conflict, but certain state attributes are expected to condition this likelihood. The first attribute I will consider is a state's economic wealth. Pursuing resources or revenue outside one's border imposes costs on a state and must be included in a state's calculation regarding the most effective way to solve the problems facing it. Poor states, especially those facing additional demands from society, may be hard pressed to support a military campaign while maintaining service and goods provision at levels that would prevent domestic protest. Outward military expansion is costly; only states with sufficient resources can hope to mount a successful military campaign against an opponent. Indeed, lateral pressure accounts of conflict have been applied predominantly to Great Powers because they are considered the only states that have sufficient resources to execute a military campaign when facing resource shortages.[60]

The application of this theory can be expanded beyond Great Powers, however, for two reasons. First, in order to engage in an inter-state dispute, states do not necessarily have to possess capabilities so as to make them Great Powers; however, they do need to possess more military capabilities than the state from which they wish to acquire resources.[61] Second, projecting military power over long distances can be very expensive, but engaging in military

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[59] See Palmer and Morgan (2006) for an extended discussion of foreign policy substitutability.
[60] See Choucri and North (1975).
[61] Therefore, military capability *relative* to the potential target is more important than how much capability as a share of the international system a state has. See discussion in Chapters 6 regarding the measurement of *relative military capabilities*.

conflict in an adjacent country is far less costly, making it more likely that any state targeted will be within a close geographical distance.[62] Only those states with large numbers of ships and planes (i.e., Great Powers) will be able to target states out of area, but minor powers are not precluded from engaging in military conflict by their relative lack of wealth.[63] However, those least likely to initiate an inter-state dispute are those with the least wealth. Therefore, I propose the following hypothesis:

> H6: Wealthy states are more likely to initiate an inter-state military conflict when faced with demographic pressure than are less wealthy states.

The second state attribute expected to condition the impact of demographic pressure is trade dependence. The literature is rife with support for the notion that trade reduces the likelihood of inter-state conflict, whether it is institutionalized through preferential trade agreements or not.[64] The opportunity costs of trade are thought to be such that states are unwilling to disrupt lucrative trade relations with their partners through inter-state conflict, especially if the pressured state is highly dependent on its trade with a potential target. Therefore, dependence on one's trading partner should dissuade military action against it, even when experiencing demographic pressure.

H7: The impact of demographic pressure should decrease as trade dependence increases.

Not all states will engage in external violence, however, when experiencing demographic pressure. Some may choose to act internally instead. Internally, states may attempt to suppress those segments of society that are increasing their demands. If the state has a strong internal defense apparatus, this may suppress societal demands without alienating the wider society;

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[62] See Vasquez (1995) for a discussion of possible explanations linking contiguity and inter-state conflict.
[63] This argument will become important when selecting the sample for analysis in Chapter 6.
[64] See Russett and Oneal (2001), McDonald (2004), Mansfield and Pollins (2001), Oneal and Russett (1997), Bearce and Omori (2005), Bearce (2003), and Mansfield, Pevehouse and Bearce (1999/2000) among others.

however, internal repression may exacerbate grievances of the population and lead to more extensive conflict between the government and the population. If the demographic pressure is being caused or exacerbated by hosting migrants or refugees from another state, another internal option available to the state is to expel the unwanted population, as Honduras did in 1969 when it expelled 300,000 Salvadoran economic migrants (Durham 1979). There are also consequences for this action, though unlikely to arise from the domestic society. The home state (from which the refugees originated) may object to the forced expulsion of the refugees of the host state, and tensions between the host and home states are likely to become strained. Contingent upon how much force is required to expel the refugees and the response of the home state, this 'internal' option may devolve into an 'external' problem for the government.[65]

Not all governments can readily engage in internal repression, however. Using the state security apparatus against the domestic population is anathema to democratic regimes. Democratic regimes, however, have institutional mechanisms that constrain leaders' ability to engage in military conflict (Morgan and Campbell 1991). Such constraints reduce the likelihood of inter-state conflict, even when domestic grievances are high. Autocracies, on the other hand, have such small winning coalitions (the group that keeps the government in power) that they are able to impose harsh policies on societal groups without losing their grip on power. It is countries that fall into this category that are most likely to suppress internally, negating the need to extend externally outside their borders during times of demographic pressure.

Bueno de Mesquita et al. (2005) suggest that a third regime type, anocracies (those semi-repressive regimes that fall between autocracies and democracies on an autocracy-democracy continuum), do not have the capability to suppress domestic opposition because their hold on

[65] El Salvador responded to the forced expulsion by invading Honduras. The ensuing "Soccer War" lasted 100 hours, led to the deaths of several thousand people and left 100,000 refugees (Durham 1979: 1).

power is so tenuous and their resources are consumed in buying off those groups that will keep the sitting government in power.[66] These types of states have difficulty repressing their relatively large selectorate, but there are few institutional constraints on engaging in military conflict, making these regimes particularly dangerous.[67] Given these arguments, I will test the following conditional hypothesis.

> H8: When experiencing demographic pressure, anocracies are more likely to initiate violent inter-state conflict than other types of political systems.

These four hypotheses will be tested in Chapter 6.

3.4 HOW ARE INTER- AND INTRA-STATE CONFLICT RELATED?

This chapter began with the description of the political relationship between states and their populations, detailing that the relationship consisted of a mutually beneficial exchange of rents to the government in return for services and goods from the government to the people. Demographic pressure, an unsustainable demographic profile, may strain this relationship by increasing the demands on government to adapt to the shifting needs of a changing population. The source of demographic pressure (whether population growth, large youth cohorts, population density, urbanization, or refugee flows) affects the types of demands placed on the government,

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[66] Anocracies, in the Bueno de Mesquita et al. (2005: 51, 42) framework, would be states with small winning coalitions ("the subset of the seelectorate of sufficient size such that the subset's support endows the leadership with political power over the remainder of the selectorate as well as over the disenfranchised members of the society") but large selectorates ("the set of people whose endowments include the qualities or characteristics institutionally required to choose the government's leadership and necessary for gaining access to private benefits doled out by the government's leadership").

[67] See Crescenzi and Enterline (1999) and Mansfield and Snyder (1995; 2002) for further discussion of the conflict tendencies of anocracies.

but regardless of what leads to the pressure, the government is called upon to respond to the people or face possibly violent consequences of non-action.

Starr (1994) outlines how 'revolution' (civil conflict) and 'war' (inter-state conflict) are linked via a two-level game logic, formulated by Putnam (1988). Starr (1994) argues that revolution can lead to war as states attempt to extract resources externally in order to address domestic unrest. Using the two-level game logic, he points out that domestic behavior has international implications, while international actions also have domestic implications. Indeed, Starr (1994: 482) also argues that war can lead to revolution through a variety of channels, including as a means of creating domestic grievance, weakening the government, or changing the distribution of resources among groups. Thus, for Starr (1994), states make decisions based on their level of resources *and* the domestic and international contexts. Societal groups are relegated to supporting status in his framework.

This project builds on his framework and expands his argument in two ways. First, the motivations of societal groups for 'revolution' are explored. If revolution can lead to war, it is imperative to determine what factors lead societal groups to rebel against the government. I have argued in this chapter that demographic pressure creates a societal demand for public goods and services from the state. The more demographic pressure there is, the more demands a society is expected to make on the government. At the same time, however, demographic pressure restricts the state's ability to provide goods and services because it limits the transfer of the very rents to the government that are needed to meet demand. This leads to grievances among societal groups that are not receiving basic goods and services, and these grievances give societal groups the motivation, or willingness, to rebel against the government.

The grievances of societal groups are expected to be ameliorated in wealthy countries when both the people and the government have a greater ability to adapt to crisis. Democracies are also expected to reduce tensions because of the access that groups have to petition their governments peacefully and non-violently remove ineffective leaders from power. Autocratic governments, on the other hand, may also not fear domestic revolt because of their ability to repress domestic protest and dissent. Finally, grievances as a function of demographic pressure may be even more dangerous for states with considerable social cleavages along which goods and services are provided.

In addition to accounting for the motivations of societal groups to rebel, a second innovation to Starr's (1994) framework is acknowledging that a rational state leader may be able to recognize and appreciate the threat posed to her government by demographic pressure and act to forestall the 'revolution' by pursuing 'war', or external military action. Thus, a leader might pursue external action in order to prevent internal rebellion. Wealthy states have the most ability to project their military capability outside their borders, and are therefore more likely to act externally than are poor states. Also, states seeking external options will not want to disrupt the beneficial relationships with their strong trade partners, and so they will seek not to engage their trade partners in military conflict. Finally, democracies, not expected to face much internal revolutionary threat, are additionally constrained by strong institutions that check the leader's ability to engage in military conflict. Autocracies, again, have the ability to repress dissenters within their borders and have little need for external action.

Given these two innovations, that demographic pressure increases societal motivations for rebellion and that states seek to prevent such rebellions from occurring, I propose a final hypothesis:

H9: The impact of demographic pressure on civil conflict should decrease if the government has recently initiated an inter-state conflict.

The logic behind this hypothesis is that attempts by the government to meet domestic demand will prevent domestic groups from rebelling. There are two caveats to consider, however. First, Starr (1994) suggests that the *outcome* of any external action should be considered when assessing the domestic response. This would suggest testing the impact of a successfully prosecuted external action on civil conflict; however, he also suggests that 'war' can lead to 'revolution'. For this reason, I assess all military conflict, not just successful ones in order to allow for the possibility of the opposite result (that external military conflict will lead to and increased likelihood of civil conflict). Second, initiating an inter-state conflict may be perceived to weaken the government and enable the aggrieved groups to have more success in their rebellion. This would also suggest that inter-state conflict would increase the likelihood of civil conflict, a result contrary to the hypothesized effect.

To summarize the hypotheses presented in this chapter, I present Table 3.1. The 'variable of interest' for each hypothesis is the name of the variable which will appear in the empirical analysis. Additionally, the 'empirical expectation' is the expected sign of the coefficient on the variable of interest. The coefficients for these variables are hypothesized to be statistically significant. Putting these hypotheses together, demographic pressure is expected to be associated with an increased likelihood of both types of conflicts, as are anocracies. State wealth is expected to have a different effect for each type of conflict: wealthy countries are hypothesized to be more likely to engage in inter-state conflict, while poor countries are more likely to experience civil conflict. Trade dependence and the social cleavage variables are not assessed in both models.

Table 3.1. Summary of Hypotheses

Intra-state conflict			Inter-state conflict		
	Variable of Interest	Empirical Expectation		Variable	Empirical Expectation
H1	Demographic Pressure	+	H5	Demographic Pressure	+
H2	Demographic Pressure * Wealth	-	H6	Demographic Pressure * Wealth	+
			H7	Demographic Pressure * Trade Dependence	-
H3	Demographic Pressure * Level of Democracy	+/-	H8	Demographic Pressure * Level of Democracy	+/-
H4a	Demographic Pressure * Ethnic Fragmentation	+/-			
H4b	Demographic Pressure * Number of Languages	+			
H4c	Demographic Pressure * Religious Fragmentation	+/-			
H9	Inter-state conflict	-			

Before testing these hypotheses empirically with statistical models, Chapter 4 will discuss demographic pressure in more detail, specifically how it is measured. Chapter 5 then tests the hypotheses linking demographic pressure and civil conflict, and Chapter 6 evaluates the hypotheses regarding demographic pressure and inter-state conflict.

4.0 MEASURING DEMOGRAPHIC PRESSURE

4.1 INTRODUCTION

The primary task of this project is to assess the impact of demographic pressure on inter- and intra-state conflict. In the previous chapter, I defined demographic pressure and detailed the proposed theoretical relationship between demographic pressure and conflict. Demographic pressure was defined as *an unsustainable demographic profile*. This suggests that the demographic characteristics of a state overwhelm the state's ability to provide for the population. This definition implies that analyzing a state's demographic profile alone is not sufficient to determine whether or not that state is experiencing *pressure* or not. Indeed, some accounting of the economic health of the state is necessary to differentiate between states with a similar demographic profile but a very different economic profile, as these states are expected to be affected by their demographic profiles differently.

The purpose of this chapter is to transfer this abstract definition of demographic pressure into a concrete measurement that can be used in the empirical tests in Chapters 5 and 6 of the hypotheses presented in Chapter 3. This operationalization of demographic pressure must map as closely to the definition as possible while utilizing available data sources. Because this concept has been neither precisely defined, nor adequately measured in previous studies, the

measures presented in this chapter are a first systematic attempt to create a comprehensive measure of demographic pressure.

This chapter is organized in the following manner. In the next section, I discuss the operationalization and sources of the five demographic indicators identified in the previous chapter: population growth, age stratification, population density, urbanization, and refugees. After discussing these indicators, I outline how I created *pressure* measures by incorporating a state's economic wealth into the measures. In the following section, 4.3, I explain the process by which I create the first composite measure of demographic pressure, an additive index, and the limitations of this variable. The final section, Section 4.4 details how I created another measure of demographic pressure using factor analysis and how it compares to the index.

4.2 DEMOGRAPHIC INDICATORS

4.2.1 Measurement

Each of the demographic indicators detailed in this section were highlighted briefly in the previous chapter. For this reason, I will not allocate space to a discussion of how each of the following indicators can lead to instability or conflict within a country. Rather, I will focus predominantly on the measurement and sources for these variables.

4.2.1.1 Population growth

Rather than utilize raw population figures, which may introduce autocorrelation into the model, I focus on the exponential growth rate, calculated as an annual average and presented as a percentage using the following formula:

$$r = \frac{\ln(\frac{p_n}{p_1})}{n},$$

where p_n and p_1 are the last and first population observations in a period, respectively, and n is the number of years in the period.[68] This figure can be either negative or positive, as populations both grow and shrink. These data were taken from the World Development Indicators (2006) CD-ROM.

The World Bank defines a state's population to include "all residents regardless of legal status or citizenship—except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin" (WDI 2006). The World Bank does not clearly define what constitutes the difference between refugees and permanent emigrants, which may add noise to this measure and potential multicollinearity with the *Refugees* variable. Though census information is not collected every year, the World Development Indicators provides a yearly figure for population growth. This yearly figure is available because states report their population yearly, interpolating data between censuses.

4.2.1.2 Age stratification (youth to adult ratio)

The age stratification of a society has a large influence on how resources are allocated among the population. There are many ways in which to measure this variable: percentage of

[68] Additional information about population growth rate calculations may be found on the Statistical Methods page of the World Development Indicators website: http://www.worldbank.org/data/wdi2006/index.htm.

children, percentage of young adults, percentage of working adults, percentage of elderly, ratio of each group to the total population, and many more. The age pyramids in tables 3.1 – 3.4 in the previous chapter illustrate that there are many different age categories that can be assessed.

Urdal (2006) has found that countries with large numbers of young people relative to the total population have a higher likelihood of civil conflict than states with a smaller ratio. He found that when these youth numbers were compared to the rest of the *adult* population, the result is even more striking. Urdal (2006) cites three reasons why 'youth bulges' can have such a negative effect on peace. First, youth tend to have a lower opportunity cost for conflict because they, unlike their elders, have often not settled into family lives and obligations. Second, this is the group most likely to be affected by a lack of employment opportunities. Third, more normatively, this group is less tied to the community than older cohorts.[69]

Considering the previous arguments, in this study I choose to measure age stratification as the ratio of youth (15-24) in a state to the adult population and derive the data from Urdal (2006). I chose the ratio of youth to the *adult* population (25-64) rather than to the *total* population (all other ages) because using the total population in the denominator could hide the potential severity of the employment situation, especially if the number of children in society is also quite large. By using only the adult population, I am able to account for the employment-eligible segment of the adult population with the least constraints to join a rebellion (or be drafted into a country's army).[70]

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[69] This justification is also proposed by Foner (1974).
[70] I do acknowledge that in many countries, children are actively involved in the labor force, and that many adults over 65 also work.

4.2.1.3 Population density

This variable, taken from the World Development Indicators (2006) CD-ROM, measures the ratio of people living within a country to the land area of the country (persons/km^2). Though called 'population density', this variable does not exactly capture whether or not the population is evenly distributed throughout a country, or if some parts (cities) are more densely populated than others. However, this variable does suggest in a more general manner if a state has a large (or small) population compared to its size. Due to the large variance of these data, the natural log was calculated and utilized in future models.

4.2.1.4 Urbanization

While population density cannot speak to the location of the population within the country, this variable measures the percentage of the population that resides in an urban area. The World Development Indicators CD-ROM (2006) is the source of these data. Some may wonder why I have not measured this variable as the *change* in the urban population from the previous year; indeed the rate at which the population moves from the countryside to the cities may create as big a problem for governments as the size of the urban population. However, other scholars (Henderson 1993; Brennan-Galvin 2002) have pointed to the increased ease of mobilization for violent conflict when a large number of people (especially poor and disaffected people) live in cities. For this reason, I chose to utilize the size of the urban population, rather than its rate of growth.

4.2.1.5 Refugees

Refugees are a different type of population than that considered in the previous measures of demographic indicators because they are considered transitory and short-term residents of the

state. Refugees are different from immigrants because they flee their homelands due to war, famine, or other catastrophic circumstances rather than purposely seeking their fortunes in another country where economic opportunities are greater. Such immigrants may be counted among the population of the country, even though they are not citizens, because they often work in the formal economy, pay taxes, and are frequently expected to remain in the country for an extended duration. Refugees are also very different than asylum-seekers who attempt to remain in a host country permanently due to an inability (usually for political reasons) to return to their home countries. Refugees are expected to return to their home country, and in most cases the refugees themselves *want* to return home, though frequently many do not.

Refugees can flow both in and out a country. Indeed, a country such as Rwanda is both the host of refugees fleeing violence in the Democratic Republic of Congo (DRC) and the source of refugees residing in the DRC who fled violence and possible retribution in Rwanda.[71] Lischer (2006) details how refugee camps across the border can be staging areas for cross-border violence that may provoke a violent response, and may lead to an inter-state conflict. On the other hand, refugees housed within the borders may strain the resources of the host country and divert money from services meant for the native population. Because the theory linking demographic pressure and violent conflict espoused in this project suggests that it is the conditions *within* a country that determine whether a state or society will engage in violence, I chose to focus on the refugees residing within a country. Additionally, the outward flow of refugees is often considered an *outcome* of violent conflict, rather than a cause (Moore and

[71] Many of the Rwandan refugees in the DRC are former members of the Rwandan army who helped perpetrate the 1994 genocide. These former belligerents fear their punishment if captured by current members of Rwanda's army. See Olsson and Fors (2004) for more details.

Shellman 2006, 2007; Rubin and Moore 2007; and Davenport, Moore and Poe 2003), providing another justification for assessing inflow rather than outflow in this study.

The data used to create this measure were acquired from the Office of the United Nations High Commissioner for Refugees (UNHCR) by Moore and Shellman (2006).[72] There was a great deal of missing data in this dataset, much of it due to the fact that many countries do not house refugees. Much of the missing data, however, could also be due to the imprecision involved in the process of counting undocumented flows of people across sometimes remote borders in mostly developing countries. For any country with missing refugee data, I coded that country as housing zero refugees in order not to lose a large number of cases. This is almost certainly a gross undervaluation of the number of refugees in some countries. Additionally, it is likely that the number of refugees listed for many countries is underreported as well due to the problems of acquiring a precise accounting. However, the fact that the number of refugees is underreported should bias *against* finding results for this variable, which is an acceptable risk, given the paucity of available data. Because some countries host a large number of refugees and many host none, I incorporate the natural log of the number of refugees housed within a state as the measurement of this variable to reduce the variance.[73]

Because the presence or absence of refugees is not frequently considered a major component of a state's demographic profile, it may be somewhat controversial to include it in this study; however, in an analysis that assesses the impact of demographic pressure on the likelihood of conflict, this group of people is theoretically expected to exert an influence on triggering conflict. For this reason, I include a measure of this variable in my analysis.

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[72] Special thanks to Jackie Rubin for making these data available.
[73] Because the natural log of zero is undefined, I added "1" to those states that hosted no refugees so the natural log of their number of refugees would equal zero.

4.2.1.6 Descriptive statistics of demographic indicators

Table 4.1 presents the descriptive statistics for each of the 'raw' measures of demographic indicators, as well as their natural log if used.

Table 4.1. Descriptive Statistics of Demographic Indicators

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Population Growth[74]	6431	1.94	1.73	-44.408	18.71
Youth to Adult Ratio	6073	29.82	6.58	12.90	45
Population Density (unlogged)	6146	121.51	362.91	0.63	6225.82
Population Density (logged)	6146	3.70	1.49	-0.46	8.74
Urbanization	6521	46.06	24.36	2.25	100
Refugees (unlogged)	6121	50,804.34	230,026	0	4,405,000
Refugees (logged)	6121	4.13	5.05	0	15.30

These demographic indicators are expected to be highly correlated, as states with a high population growth rate will be more likely to have a large number of young people, and highly urbanized small countries will also likely be densely populated. Additionally *urbanization* is expected to be negatively associated with many variables including *population growth* and *youth to adult ratio* because people living in urban areas do not require as many children as their rural compatriots do to help work the land. This would also account for a more balanced age pyramid as access to more reliable health facilities might also mean that urban parents do not need to have large families to ensure that some children live to adulthood. Table 4.2 reports the correlations among these variables.[75]

Most of the correlations among the five demographic factors are relatively low, though two correlations are moderate: *population growth* and *youth* and *urbanization* and *youth*. The

[74] The extremes of this variable are functions of war. The minimum value translated to Kuwait in 1992 when a large proportion of the population fled the onslaught of the Iraqi army, while the maximum value corresponds to the return of refugees to Rwanda after the 1994 genocide.

[75] In this correlation matrix, I do not included the unlogged population density and refugee variables because they are not used in any of the subsequent analysis.

moderate positive correlation between population growth and youth was expected because countries with large growth rates tend to have a large number of young people. Conversely, urban societies tend to have lower birth rates than rural societies due to the decreased need for additional children to work on the family farm. The inclusion of all of these variables in the same model may lead to incorrect inference due to multicollinearity. This is one of the primary motivations for the creation of a composite measure of demographic pressure later in the chapter.

Table 4.2. Correlations of Demographic Indicators

	Population Growth	Youth to Adult Ratio	Population Density	Urbanization	Refugees
Population Growth	1.00				
Youth to Adult Ratio	0.43	1.00			
Population Density	-0.22	-0.22	1.00		
Urbanization	-0.18	-0.57	0.11	1.00	
Refugees	-0.06	-0.13	0.04	0.13	1.00

4.2.2 Creating 'pressure' variables

While each of the preceding five variables captures many important aspects of a state's demographic profile, none of these variables accurately captures whether or not the demographic profile led states to experience 'pressure'. Chapter 3 suggested that wealthy states can adapt to a demographic profile much more easily than a less wealthy state can adapt to the same profile. For this reason, I divided each demographic indicator by *state wealth* (as described below).

4.2.2.1 State wealth

This variable is operationalized as the natural log of the relative gross domestic product per capita (in 1996 US dollars) of a state. While GDP per capita is not a perfect measure of a

state's capacity or wealth, it is preferable to a simple measure of GDP which captures only the size of the domestic economy. *Ceteris paribus*, states with large economies will have more tools at their disposal to address demographic changes, while states with smaller economies will be more constrained. However, states of various size in terms of population can have either large or small economies, but a large state with a small economy is far less wealthy than a large state with a large economy. It is the wealth of the state, rather than simply the size of the economy that will impact that state's ability to respond to societal demands, and thus, a measure of wealth (rather than size) is used in this study. The natural log is employed due to the large variance of this variable, considering the wide disparity among the states in the sample. The data are derived from Gleditsch (2002).

4.2.2.2 'Pressure' indicators

Having divided each demographic indicator by state wealth, there are now five 'pressure' indicators. Their units are not meaningful given that the denominator of each variable is ln($US/person); however, they do capture the intuition that if, for example, two countries have the same rate of population growth, the less wealthy country will feel more pressure than will the more wealthy country (and thus have a higher score for *population growth*). Table 4.3 presents the summary statistics of *state wealth* and the five 'pressure' indicators. These 'pressure' indicator variables will be used in some of the analyses in Chapters 5 and 6.

Table 4.4 presents the correlation matrix of *state wealth* and the five 'pressure' indicator measures. As expected, there is a high (and often negative) correlation among many of these variables, especially considering that they all have the same denominator. Still, some variables remain uncorrelated, the most interesting of which is *refugees*, which is barely correlated with state wealth. This is probably a function of the fact that both poor and wealthy countries are

often the repository of such populations; poor countries frequently share a border with states that produce refugees, receiving the fleeing populations often by default, and wealthy countries can often afford to house long-term refugees when there is little success of returning them in the short term to their homes.

Table 4.3. Descriptive Statistics of State Wealth and 'Pressure' Indicators

Variable	N	Mean	Standard Deviation	Minimum	Maximum
State Wealth (unlogged)	6277	6107.14	6648.80	281.26	46,064.72
State Wealth	6277	8.18	1.06	5.64	10.74
Population Growth Pressure	6050	0.25	0.21	-4.58	1.85
Youth Pressure	6047	3.78	1.15	1.29	6.51
Density Pressure	5767	0.46	0.19	-0.06	1.02
Urbanization Pressure	6126	5.37	2.45	0.35	12.45
Refugee Pressure	6092	0.51	0.64	0	2.48

Table 4.4. Correlations of 'Pressure' Indicators with State Wealth

	State Wealth	Population Growth Pressure	Youth Pressure	Density Pressure	Urbanization Pressure	Refugee Pressure
State Wealth	1.00					
Population Growth Pressure	-0.38	1.00				
Youth Pressure	-0.88	0.52	1.00			
Density Pressure	-0.21	-0.09	0.09	1.00		
Urbanization Pressure	0.72	-0.29	-0.64	-0.13	1.00	
Refugee Pressure	-0.04	0.03	0.05	0.06	0.02	1.00

As in the previous correlation matrix, *youth* and *population growth* and *youth* and *urbanization* are moderately correlated. This suggests that dividing the indicators by *state wealth* did not change the relationship between these variables. Thus, the problem of including

all five of the 'pressure' indicators remains the same: multicollinearity among the indicators may lead to faulty inference.

The correlations in Table 4.4 also show that *state wealth* is highly correlated with two of the newly created 'pressure' measures, *youth* and *urbanization*. These two high correlations make intuitive sense based on the following logic. First, large youth cohorts are more common the developing world where countries have lower per capita GDPs and there is a stronger reliance on primary commodity exports, frequently necessitating larger families. In the developed world, where countries are quite wealthy, family size is shrinking resulting in fewer young people in comparison to the remainder of the adult population. The second high correlation, between *state wealth* and *urbanization*, also makes intuitive sense using a similar logic. In rural societies, there tends not to be much industrialization to draw farmers to the cities, leading to a reliance on primary commodities which generate far less wealth than finished industrial goods produced in more urbanized countries. Inclusion of *state wealth* and these two 'pressure' variables in a model may also impact the amount of multicollinearity in that model, which provides additional incentive to produce a composite measure of demographic pressure.[76]

Finally, the correlations between the 'pressure' and the 'raw' indicators are presented in Table 4.5. It is quite clear that these measures are very highly correlated, which might suggest that dividing each indicator by state wealth is an unnecessary step. While this may seem to be the case empirically, theoretically it is important to distinguish between the two measures. The 'raw' measures capture only the state's demographic profile while the 'pressure' measures account for the state's ability to adapt to the profile by accounting for the wealth of state. For

[76] See Caldwell (2005) for a thorough discussion on the relationship between poor, rural societies and large families.

this reason, I use the 'pressure' measures, both individually and to create two composite measures of demographic pressure to be discussed in subsequent sections.

Table 4.5. Correlations Between 'Pressure' Variables and 'Raw' Indicators

Variables	Correlations
Population Growth	0.97
Youth to Adult Ratio	0.93
Population Density	0.94
Urbanization	0.98
Refugees	0.98

4.3 CREATING ADDITIVE INDEX OF DEMOGRAPHIC PRESSURE

The five 'pressure' measures created in the last section incorporate both specific indicators of a state's demographic profile and the state's economic ability to adapt to the profile. Using these five measures to determine the likelihood of both inter- and intra-state conflict could provide an interesting first step in answering the questions posed by this project. However, this project is concerned with demographic pressure in a more comprehensive manner than simply assessing individual indicators. Indeed, demographic pressure was defined in Chapter 3 as *an unsustainable demographic profile*. This suggests that all the indicators should be assessed together rather than separately. Therefore, this section will detail how I created an additive index to capture a more comprehensive measure of demographic pressure.

To create an additive index, the first step is to determine the criteria by which continuous measures of the 'pressure' variables could be condensed into either categorical or dichotomous variables that can be added together to create the index. Though there are many ways to accomplish this task, no technique suggested itself more strongly than another, and there are no other indices of demographic pressure that I could use as a guide. I therefore decided to

dichotomize each 'pressure' indicator, assigning "1" if the state had an above average value for that measure and "0" otherwise. The mean of each of the 'pressure' indicators is listed in Table 4.3 with the other descriptive statistics.

As noted, there were several other decision rules I could have used to create this variable. Still ending with a dichotomous measure for each indicator, I could have assigned a "1" for states with a value greater than the 75th percentile of the sample. Similarly, I could have picked any point as an arbitrary cut-off for creating this measure. Additionally, I could have created an ordinal measure with 'low', 'medium', and 'high' categories, using perhaps the mean and the 75th percentile as cut-off points for the medium and high groups. However, I chose to use the more simple coding described in the previous paragraph as a first cut at measuring the concept of demographic pressure. First, because there is no precedent in the literature for converting individual demographic indicators into one composite measure, it is not clear at what point such indicators create *pressure*, a point complicated by the dividing of each indicator by state wealth. Second, by using a lower threshold (as compared to the 75th percentile), more states will be coded as having demographic pressure. This will add noise to the tests conducted in the subsequent chapters; however, if despite this noise, the measure still produces the hypothesized results, I can be more confident of the impact of demographic pressure on violent conflict.

Having determined the coding rule and created the five dummy variables (one for each indicator), the second step was to combine the dummy variables together. I chose not to weight the measures any differently before combining them because it was not obvious how such weighting would proceed. It is unclear whether various measures of demographic pressure should be created for each type of conflict. While different individual factors may be more commonly associated with one type of conflict than another, the state can only experience

demographic pressure. How a state responds to such pressure is the subject of this study, but it is theoretically untenable to utilize different measures of demographic pressure for each type of conflict. Thus, I simply added together the dummy variables to arrive at a count of the number of 'pressure' indictors that exceeded the mean of all countries. A tabulation of the categories of this variable may be found in Table 4.6, and its summary statistics may be found in Table 4.11 at the end of Section 4.4.

Table 4.6. Tabulation of Additive Index

Category	*Frequency*	*Percentage of Cases*	*Cumulative Percentage*
0	39	0.71	0.71
1	564	10.26	10.97
2	1,849	33.64	44.61
3	2,225	40.48	85.08
4	735	13.37	98.45
5	85	1.55	100.00
Total	5,497	100.00	

There are a few potential flaws in this measure, and I will address two of them here. First, it may be suggested that a count of the number of indicator 'pressure' variables above the mean does not accurately capture the concept of demographic pressure. While logically assuming that states with more areas of concerns are more likely to be experiencing pressure than are states with fewer areas of concern, cases in which one measure creates a great deal of pressure, such as very high youth cohorts or large refugee populations, would be coded as having less pressure than a state with a few indicators that are slightly above average *in the sample*. Many cases, therefore, may appear to have more or less pressure than they actually have simply by using this count variable.

Second, this measure is very dependent on the sample of countries to determine where the cut-off point is in order to dichotomize the 'pressure' variables. The presence of outliers, or

the addition or deletion of certain cases due to missing data could change the value of the index for many countries. While many decision rules for coding an additive index could result in instability due to sample properties, it cannot be ignored that this measure, while a good first cut at measuring demographic pressure, is not ideal for the empirical analyses to follow. For this reason, I created another composite measure of demographic pressure using factor analysis, which will be detailed in the following section.

4.4 USING FACTOR ANALYSIS

Factor analysis is a statistical procedure "to derive a set of uncorrelated variables for further analysis when the use of highly intercorrelated variables may yield misleading results in regression analysis" (Kim and Mueller 1978b: 5). The fundamental assumption of factor analysis is that "some underlying factors, which are smaller in number than the number of observed variables, are responsible for the covariation among the observed variables (Kim and Mueller 1978a: 12). In this project, I have five variables outlined in Section 4.2 with varying levels of correlations that I believe all measure one underlying concept: demographic pressure. Using all five variables in a statistical model may induce multicollinearity due to the bivariate correlations among variables, which provides a valid justification for attempting to create a single measure instead. Indeed, one of the main justifications for performing factor analysis is for data reduction purposes (Kim and Mueller 1978a: 50).

Though factor analysis has been used in International Relations research,[77] it is much more commonly applied in studies of political behavior to reduce a large number of survey questions into a smaller number of categories.[78] Because I am using factor analysis for data reduction rather than to test hypotheses about which component variables have high inter-item correlations, I will use *exploratory* factor analysis instead of *confirmatory* factor analysis.[79]

Table 4.7. Inter-item Correlations

Variable	N	Sign	Item-test Correlation	Alpha
Population Growth Pressure	6050	+	0.46	0.44
Youth Pressure	6047	+	0.76	0.08
Density Pressure	5767	+	0.15	0.47
Urbanization Pressure	6126	-	0.84	0.25
Refugee Pressure	6092	+	0.20	0.49

The first step in this process is to gauge the inter-item correlation of the variables to be used. Table 4.7 presents the sign of the correlation of each variable with the rest of the variables as a group (versus the bivariate correlations reported previously), the inter-test correlation, which reports the correlation between the variable and the rest of the variables as a group, and Cronbach's Alpha (reliability of the scale) without that variable included. The overall reliability of the scale is reported as 0.45.

In this table, a few items are worth noting. First, urbanization is negatively correlated with the other variables, it has the highest correlation with the rest of the variables, and the exclusion of this variable would reduce the reliability of the scale by almost half. This highlights both the importance of this variable to the creation of a composite measure of demographic

[77] See Rummel (1972) as an example.
[78] See Barker and Tinnick (2006) and Claggett and Pollock (2006) as examples.
[79] I do have an expectation that all five of my 'pressure' variables will load onto only one variable; however, the purpose of this exercise is to create a variable for use in future analyses, not test whether these five variables are the only or best measures of demographic pressure, a process that would necessitate the use of causal models and systems of equations.

pressure as well as what information may be lost in the additive index. Because urbanization is negatively correlated with the other variables, it would be rare for states to have both high urbanization and high population growth (for example), which would make the value of the index smaller, and might miss a potentially explosive situation.

Second, both population density and refugees have low correlations with the rest of the scale, and their alpha values suggest that their removal would improve the reliability of the scale. While somewhat troubling and a possible indication that these variables do not belong with the other three, theoretically, these variables are important, and thus, I will leave them in the calculation of a composite variable. Indeed, factor analysis is a statistical procedure which is meant to serve theory; there is a great deal of room for subjective decision-making on the part of the researcher in terms of which variables to include. Additionally, factor analysis identifies the common elements among variables and utilizes those elements to create factor scores, even if the commonality is relatively small. As with the additive index, the inclusion of these weakly correlated variables may make it more difficult to extract one single factor (*demographic pressure*) and bias against finding results since the measure may have been stronger without these variables

Finally, the alpha score for the youth variable indicates that it is very important in the creation of a measure using factor analysis, given that its absence would reduce the reliability of the measure dramatically. With these issues in mind, I turn to the second step of the process: using factor analysis to create a measure of demographic pressure.

The estimation procedure I used to calculate the factor scores is *principal factors*, a procedure that uses the squared multiple correlation as an estimate for the communality. The communality of a variable is the variance of that variable that is common with the other variables

under investigation (Rummel 1970). This method of estimation differs from the well-known *principal-components* method in that principal-components assumes that the communality of a variable equals "1".[80] The calculation of the communality is essential in determining how each variable loads on a particular factor, as well as ultimately creating the factor scores which will become the values used in the subsequent statistical analysis.

Having performed the principal factors procedure, Table 4.8 presents the eigenvalues derived from each factor as well as the factor loadings for each variable on the three most significant factors.[81] Eigenvalues are measures of the amount of variance accounted for by a factor, and they are frequently used to determine how many factors should be extracted from the data (Kim and Mueller 1978a). The factor loadings indicate how much of the variance of that variable is accounted for by the factor (Rummel 1970).

Table 4.8. Initial Factors

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Eigenvalue	1.43	0.20	0.04	-0.13	-0.24
Population Growth Pressure	0.54	0.27	0.04		
Youth Pressure	0.82	-0.003	0.02		
Density Pressure	0.09	-0.31	0.05		
Urbanization Pressure	-0.68	0.17	0.07		
Refugee Pressure	0.03	-0.03	0.19		

Population growth, the youth to adult ratio and urbanization seem to load relatively highly on the first factor, though urbanization loads negatively. Both population density and

[80] Because of the importance of the communality in generating the factor loadings, I wanted to use the method that relied on the data most heavily to create the measure. For this reason, principal factors is preferred to principal-components. A factor score created with principal-components is correlated with the measure I use throughout the analysis at 0.98.

[81] The maximum number of factors that could be created is five, considering that there are five component variables being combined in the analysis. If five viable factors were created from the five component variables, then each of the variables would be perfectly uncorrelated with all of the other variables. The expectation is that only one factor will emerge as viable, suggesting that the common elements extracted from all five variables is what makes *demographic pressure*.

refugees load more strongly on another factor (Factor 2 and Factor 3, respectively), though in their appendix, Barker and Tinnick (2006) illustrate that variables with both negative and low loadings can still be successfully incorporated into a valid factor score. This fact is especially reassuring, given that only the first factor achieved an eigenvalue greater than one, indicating that only one factor should be extracted from these data.

Table 4.9. Rotated Factors

	Factor 1	Factor 2	Factor 3
Eigenvalue	1.43	0.21	0.04
Population Growth Pressure	0.52	0.32	0.04
Youth Pressure	0.81	0.06	0.03
Density Pressure	0.11	-0.30	0.06
Urbanization Pressure	-0.70	0.12	0.05
Refugee Pressure	0.03	-0.02	0.19

Before extracting factor scores, however, one more procedure must be performed. In the creation of the initial solution presented in Table 4.8, three restrictions were made: there are some number *k* common factors (less than or equal to the number of component variables), the underlying factors are orthogonal (perpendicular) to each other, and the first factor extracted accounts for as much variance as possible with each subsequent factor accounting for as much of the remaining variance as it can (Kim and Mueller, 1978a: 49). While the first restriction must continue to hold, the other two restrictions may be relaxed. I choose to maintain orthogonality among factors, meaning that the factors extracted are uncorrelated with each other. Kim and Mueller (1978a: 50) seem quite indifferent to rotation technique, suggesting that there is not much difference in outcome regardless of which technique is used. Rotation is suggested as a step in the process which ensures that the variance explained is attributed to the appropriate factor. Because it is relatively clear from the eigenvalues listed in Table 4.8 that there is only

one legitimate factor to be extracted from the data, it is unlikely that the results will change dramatically. However, I rotated the matrix using verimax rotation, an orthogonal procedure, and report the results in Table 4.9.

The results in Table 4.9 are very similar to those in Table 4.8, suggesting that rotation did not substantially change the composition of the factor scores; however, I will utilize the factor scores produced after rotation to create the demographic pressure variable. Thus, having rotated the matrix, I am able to determine how many factors can be extracted from and data. Because only one factor had an eigenvalue greater than "1" and the low loadings of most of the variables on subsequent factors (see Factor 2 and Factor 3 columns of Table 4.9), I believe that only one factor can be legitimately extracted from the data. This is supported by the scree plot in Figure 4.1 which shows a considerable drop from Factor 1 to Factor 2, as well as the flattening of the line for the rest of the factors. I am, therefore, confident that only one factor is common among the five component variables.

Finally, because of the high correlation between *state wealth* and several of the demographic components (see Table 4.4) as well as the fact that *state wealth* is included in each pressure measure, it is important to discover whether the commonality among the five measures is a function of *state wealth*, or if it can be traced to another common element, which I am labeling demographic pressure. Therefore, I replicated the creation of the demographic pressure measure using factor analysis with the 'raw' measures of the demographic variables. These variables correlated very highly with their 'pressure' measure equivalents, so it is unlikely that *state wealth* is driving the commonality among them; however, it is useful to create the measure as a robustness check that the state wealth component is not what is being picked up through the factor analysis.

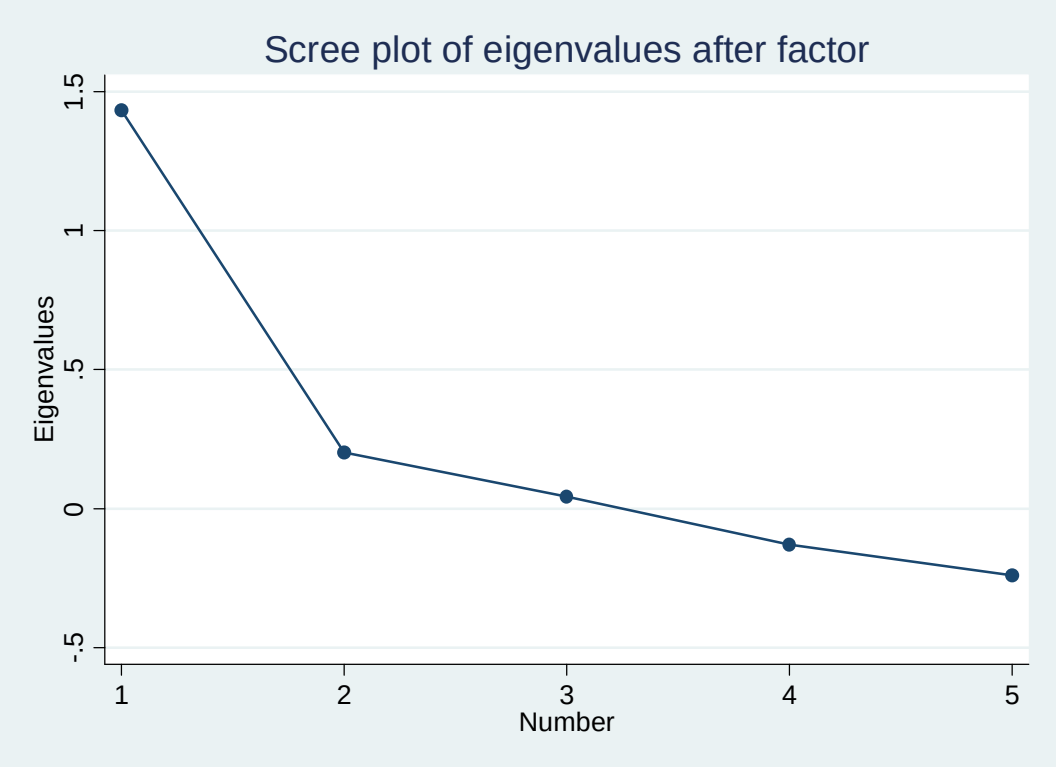

Figure 4.1. Scree Plot of Eigenvalues

Table 4.10 presents the rotated factors for this exercise. The component variables were the measures of each demographic element *without* being divided by the state's GDP per capita. As with the previous construction of this variable, only one factor loads with an eigenvalue greater than one. In this specification, however, three of the variables load with a negative correlation (as opposed to one variable in the previous specification), and population growth loads almost equally on both factors. Theoretically, the previous specification of the variables is more appropriate because of the addition of GDP per capita attempts to capture the sustainability of the demographic profile, a feat which cannot be accomplished by looking simply at the 'raw' components of the state's demographic profile. Given the stronger theoretical standing of the first measure, I will use that for the majority of the analysis in the following chapters.

Table 4.10. Rotated Factors for Unweighted Component Variables

	Factor 1	Factor 2
Eigenvalue	1.19420	0.25056
Population Growth	0.3870	0.3682
Youth	0.7398	0.1880
Density	-0.2190	-0.2760
Urbanization	-0.6444	0.0532
Refugee	-0.1838	0.0244

The descriptive statistics and correlations among the three composite measures created in this chapter (index, factor score with *state wealth*, factor score without *state wealth*) may be found in Tables 4.11 and 4.12. The correlation between the two measures created with factor analysis is 0.96, which lends credibility to the claim that the component variables have more in common with each other than their *state wealth* component. The low correlation between the index and the factor analysis measures also suggests that a simple count of the above average components is a very rough measure of demographic pressure. Still, as a robustness check, this index will be employed in the analyses in Chapters 5 and 6.

Table 4.11. Descriptive Statistics for the Composite Measures of Demographic Pressure

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Demographic Pressure (Index)	5473	2.65	0.98	0	5
Demographic Pressure (Factor Analysis)	5473	4.52	0.85	0	6.89
Demographic Pressure (Factor Analysis without State Wealth)	5497	3.78	0.80	0	5.24

The following two chapters test the hypothesis proposed in Chapter 3 using the various measures of demographic pressure created in this chapter.

Table 4.12. Correlations Among Composite Measures

	Demographic Pressure (Index)	Demographic Pressure (Factor Analysis)	Demographic Pressure (Factor Analysis without State Wealth)
Demographic Pressure (Index)	1.00		
Demographic Pressure (Factor Analysis)	0.33	1.00	
Demographic Pressure (Factor Analysis without State Wealth)	0.23	0.96	1.00

5.0 BY THE PEOPLE? DEMOGRAPHIC PRESSURE AND CIVIL CONFLICT

5.1 DEMOGRAPHIC PRESSURE AND INTRA-STATE CONFLICT

The previous chapter focused on the operationalization of the main independent variable of this analysis, *demographic pressure*. In this chapter I test the first set of hypotheses linking demographic pressure and lethal political conflict to determine the conditions under which demographic pressure leads to intra-state conflict. This section reviews the hypotheses forwarded in Chapter 3, while the next section details the research design implemented to test the hypotheses. The third section analyzes the results of the empirical tests, the fourth section discusses the implications of the results, and the final section briefly concludes the chapter.

The theory proposed in Chapter 3 suggested that societal groups assess the goods and service provision of the government as a way to gauge their level of satisfaction with the government. Demographic pressure is expected not only to increase the needs and demands of the population (through the need for more education, health, or general welfare spending, depending on the type of pressure exerted on society), but also to reduce the resources available to the government to provide services (through decreased rents).[82] The decrease in service

[82] Rents may be decreased as farmers move from rural areas to urban areas where they may enter the informal labor market. In these instances, rents from the crops not farmed are not received, as well as any taxation of wages from the informal sector. Additionally, as the population expands, especially in the form of newborn children, the population is growing, but more revenues are not being collected. This translates into a decrease in rent per capita

provision or the government's inability to transfer spending to needed services may lead the population to become disaffected with the sitting government, leading to grievances that increase societal groups' motivation or willingness to engage in political violence. While this disaffection could be voiced through the political process, it may also manifest in political violence against the government, including civil conflict. If groups believe that either (a) they can manage the state more effectively than the government, or (b) they would be better off if they were governed as a separate entity from the current state, they may organize to take over the government or secede from the state, respectively. For these rebellious options to be pursued, the problems associated with demographic pressure are probably not experienced in isolation.[83] However, because societal groups are continuously evaluating the performance of the government, those factors that inhibit the government's ability to meet the needs of the people, such as demographic pressure, may lead to civil conflict. This argument highlights the first hypothesis of this chapter:

H1: Demographic pressure increases the likelihood of civil conflict within a state.

Not all states are equally prone to civil conflict, however, even given similar levels of demographic pressure. Many authors have theorized that both willingness and opportunity are necessary for a war to occur (Most and Starr 1989). In the study of civil wars, this has translated into the greed (opportunity) versus grievance (willingness) literature (Regan and Norton 2005; Collier and Hoeffler 2004, 1998; de Soysa 2002a). Demographic pressure may create grievances within society due to its effect on service provision by the government. Therefore, if

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and not pure rent; however, it still represents a limitation on the government in the presence of demographic pressure.

[83] In this study, demographic pressure proxies the grievances of societal groups due to inadequate service provision by the state. Though Lichbach (1984) states that grievances are a necessary condition for civil conflict, I do not assume that demographic pressure is the *only* path through which a society may have grievances against the government. Civil conflicts are observed in countries without demographic pressure, so in the following empirical analysis, I will control for a variety of factors that have been shown to be associated with civil conflict. Thus, I argue that the presence of demographic pressure in a country may create new grievances against the government or exacerbates existing grievances that increase the state's likelihood to experience civil conflict.

demographic pressure provides the willingness for societal groups to act violently against the government, factors that increase the opportunity for civil conflict are expected to work with demographic pressure to increase the likelihood of civil conflict.

The first proposed opportunity factor is a state's wealth in terms of per capita gross domestic product. Poverty is expected to increase the likelihood of civil conflict because members of society do no forgo much income to leave their fields or jobs to join a revolution or rebellion because they are not earning an income anyway. At the other end of the poverty-wealth spectrum, the cost of rebellion for those in wealthy countries is high because the rich would risk their economic well-being, especially because there is a positive probability of losing the conflict. While the arguments presented here deal with individuals, an aggregated argument is expected to hold: civil conflict is most likely for states that are economically poor. Many previous studies (Regan and Norton 2005; Collier and Hoeffler 2004; Miguel, Satyanath and Sergenti 2004; Fearon and Laitin 2003; Sambanis 2001) that account for the impact of wealth on civil conflict have found that a linear relationship exists: increasing wealth reduces the likelihood of civil conflict.

When poor states are experiencing demographic pressure, their economic situation is likely to decline even further as the state provides fewer services than previously. This increased grievance may work with low opportunity costs for conflict to incentivize members of society to engage in lethal political violence. This interaction between willingness and opportunity lead to the following hypothesis:

> H2: The impact of demographic pressure on civil conflict is expected to decrease as a state's wealth increases.

The second state attribute which may condition the impact of demographic pressure on civil conflict, level of democracy, can capture both opportunity and willingness motivations for

conflict. Unlike state wealth, however, the relationship between democracy and civil conflict is expected to be non-linear (Muller and Weede 1990). Other studies (Fearon and Laitin 2003; Regan and Norton 2005; Hegre et al. 2001) have found evidence of this curvilinear relationship which exists because the people's ability to petition the government regarding their grievances varies across regime types. In highly autocratic regimes, the people do not have an ability to petition the government; however, autocratic governments have the ability to repress domestic protest against them. Because they do not rely on the consent of the people to govern them, they are less inhibited than are other types of governments to quell any attempts to revolt. Therefore, while societal gropus have grievances against autocratic regimes, they have little opportunity to rebel due to the repressive capacities of the autocratic state.

Strongly democratic regimes, on the other hand, do rely on the consent of the people to govern, and they cannot use the power of the state to suppress domestic protest violently. However, in democratic systems, the people have peaceful means through which they can express their grievances and replace the government if it is not responsive (via elections). For this reason, citizens in democracies have much less incentive to resort to violence to achieve political ends. Thus, while democracies allow for the free association of people and the creation of opposition parties that could serve as sources of mobilization for rebellion, the institutional structure of democracies provide a variety of avenues for disaffected groups to seek redress peacefully. It is those states with some characteristics of both autocracies and democracies that are expected to provide the most willingness and opportunity for their citizens to rebel. These states typically allow people to organize into opposition groups; however, they often exclude political rivals from the government. This mix allows for people to organize against the government, and it prevents them from airing their grievances, which, together, provide both

opportunity and incentive for people to rebel. As demographic pressure increases grievances in a state, it is expected to interact with the opportunity structure within the state created by the state's regime type. This non-linear relationship between level of democracy and civil conflict and the additional incentives for conflict that demographic pressure provides lead to another testable hypothesis:

> H3: The impact of demographic pressure on the incidence of civil conflict increases as a state's level of democracy increases from very autocratic then decreases once it achieves a higher level of democracy.

Finally, demographic pressure may exacerbate existing grievances within a state. In states where the population is divided along ethnic, linguistic, or religious lines, if demographic pressure affects some groups more strongly than others, problems may arise which provide incentives for the people to engage in violent action. These problems may be especially acute if the government is comprised mostly of one group to the exclusion of others. Therefore, though demographic pressure is expected to proxy grievances within a society, it can also magnify the impact of cultural cleavages within the state. However, like the level of democracy, this impact is not expected to be linear. For states with no cleavages due to a homogenous culture (i.e., Japan), demographic pressure has no cleavage to magnify. Somewhat similarly, the impact of demographic pressure should not be magnified in pluralistic societies with a great deal of heterogeneity (i.e., United States). Those societies, however, that fall in the middle of the homogenous/heterogeneous spectrum may experience an amplified impact of demographic pressure because they are the most likely states to struggle to balance these cleavages.

Fearon and Laitin (2003) identified three dimensions along which cleavages could form in a country: ethnic linguistic and religious. Reports of conflicts in Africa and South Asia frequently refer to divisions among ethnic groups and contestation of government rule along

ethnic lines. One recent example of this is the rioting that broke out in the aftermath of Kenyan elections in late 2007.[84] Religious divisions, on the other hand, are more frequently cited in conflicts in the Middle East and Northern Ireland. Linguistic concerns have been cited as motivations for the possible break-up of Belgium.[85] Multiple cleavages can occur in the same country such as in Spain where ethnicity and language match closely or in India with its highly diverse population. Demographic pressure is expected to exacerbate the tensions caused by division within the country.

Because of the homogeneity-pluralism continuum hinted at above, both ethnic and religious fractionalization are expected to have a non-linear relationship to civil conflict. Languages, on the other hand, tend to disrupt the ability of the government to communicate with the people as well as provide services such as education, and the more languages spoken in the country, the larger this problem may be, especially if the language spoken in a region is not recognized as an official language of the state. Therefore, the number of languages spoken in a country is expected to have a linear relationship with civil conflict.

From the preceding discussion, three final hypotheses can be drawn. [86]

> H4a: The impact of demographic pressure on the occurrence of civil conflict increases as ethnic fractionalization increases then decreases as diversity increases.
>
> H4b: The impact of demographic pressure, conditioned on the number of languages spoken in a country, is expected to increase as the number of languages increases.

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[84] Barney Jopson, "Kenya erupts as Kibaki named victor," *Financial Times* (Europe edition) 31 December 2007, p. 3; Barney Jopson and William Wallace, "Mob violence drives fear of spreading ethnic conflict," *Financial Times* (Asia edition) 3 January 2008, p. 2.

[85] "Time to call it a day," *Economist* (US edition) 8 September 2007; Elaine Sciolino, "Belgian, Adrift and Split, Sense a Nation Fading," *New York Times* (Late edition) 21 September 2007, p. 4.

[86] See Appendix A for why the three measures of social cleavages are tested separately and not included together in the same model.

H4c: The impact of demographic pressure on the occurrence of civil conflict increases as religious fractionalization increases then decreases as diversity increases.

5.2 RESEARCH DESIGN

To test the hypotheses summarized above, I evaluate a country-year model of civil conflict. My sample includes all countries in the world, given data availability, for the years 1961-1999. To test H1, the unconditional relationship between demographic pressure and civil conflict, I will utilize a logistic regression to estimate Equation 5.1.

(5.1) $\Pr(\textit{Civil Conflict}) = \beta_0 + \beta_1 * \textit{Demographic Pressure} + \beta_x * \textit{Control Variables}$

Hypotheses 2-4c are conditional hypotheses, indicating that the impact of demographic pressure on civil conflict is dependent on the value of other variables of interest. To test these hypotheses, the demographic pressure variable is interacted with (multiplied by) other independent variables. To test H2 and H4b, the relationships between demographic pressure and state wealth or number of languages, respectively, only one interaction term is included multiplying these two variables together. Equation 5.2 represents this type of interaction, using the variables to test H2.

(5.2) $\Pr(\textit{Civil Conflict}) = \beta_0 + \beta_1 * \textit{Demographic Pressure} + \beta_2 * \textit{State Wealth} + \beta_3 * \textit{(Demographic Pressure*State Wealth)} + \beta_x * \textit{Control Variables}$

Several of the hypotheses presented here are somewhat complicated because some of the variables of interest are expected to have a non-linear impact on civil conflict, especially in the presence of demographic pressure. Thus, to test Hypotheses 3, 4a, and 4c, squared terms of the variables are included in the model to account for the nonlinear relationship between that

variable and civil confict, which requires that *demographic pressure* must be multiplied with the original term as well as its square. As an example of this more complicated model, Equation 5.3 presents the estimating equation for H3, which assesses the relationship between demographic pressure and the level of democracy:

(5.3) $\Pr(\textit{Civil Conflict}) = \beta_0 + \beta_1 * \textit{Demographic Pressure} + \beta_2 * \textit{Level of Democracy} + \beta_3 * \textit{Level of Democracy}^2 + \beta_4 * (\textit{Demographic Pressure} * \textit{Level of Democracy}) + \beta_5 * (\textit{Demographic Pressure} * \textit{Level of Democracy}^2) + \beta_x * \textit{Control Variables}$

Because states that have recently experienced civil conflict are expected to be more likely to experience another as opposed to a country with a long history of civil nonviolence, it is important to account for any temporal dependence among the observations. To do this, I use Tucker's (1999) program to count the number of peace years since the last civil conflict and estimate a natural cubic spline function which smoothes the baseline hazard of civil conflict (Beck, Katz, and Tucker 1998). The splines are calculated and included in each model; however, they are not reported in the final results.[87]

Table 5.1 summarizes the empirical expectations of the hypotheses that will be tested in this chapter. A positive sign (+) indicates that the interaction of the two variables is expected to have in increased impact on the likelihood of civil conflict, while a negative sign (-) suggests that the interaction is hypothesized to have a dampening impact on the probability of a civil conflict. *Level of Democracy, Ethnic Fractionalization,* and *Religious Fractionalization* all have both positive and negative expectations. This means that relationship between an interaction of those variables and demographic pressure is expected to exhibit an inverted-U shaped relationship with

[87] The number of peace years is reported for each model and will be discussed further below. Signorino and Carter (n.d.) criticized this method of accounting for temporal dependence because the cubic splines are not directly interpretable. However, in this analysis, I am not attempting to explain the shape of the underlying hazard of civil conflict. Signorino and Carter (n.d.) acknowledge that use of cubic splines does not bias the results of the analysis in any way; it simply does not allow for a more intuitive understanding of the role of time in predicting conflict.

the likelihood of civil conflict. Therefore, the interaction of demographic pressure with the variable of interest is expected to be positive while the interaction of demographic pressure and the variable's square is expected to be negative.

Table 5.1. Intra-state Hypotheses and Empirical Expectations

Hypothesis	*Variable of Interest*	*Empirical Expectation*
H1	*Demographic Pressure*	+
H2	*Demographic Pressure * State Wealth*	-
H3	*Demographic Pressure * Level of Democracy*	+/-
H4a	*Demographic Pressure * Ethnic Fractionalization*	+/-
H4b	*Demographic Pressure * Number of Languages*	+
H4c	*Demographic Pressure * Religious Fractionalization*	+/-

5.2.1 Dependent Variable

The dependent variable in these models, *civil conflict*, is a dichotomous measure of the occurrence of a civil conflict in the year of the observation. A civil conflict is defined as "a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths," (Gleditsch et al. 2002: 618-619) and is taken from the Uppsala/PRIO Armed Conflict Dataset. The variable is coded "1" if a conflict resulting in 25 or more battle deaths occurred in that year and "0" otherwise. In the sample used for the majority of the models in this chapter, approximately 14.5% of cases are coded as having a civil conflict while the remaining cases have no civil conflict.

Many studies of civil conflict assess the onset, rather than the occurrence of civil war.[88] When this strategy is employed, subsequent years of conflict are frequently coded as missing unless a new conflict begins. Unlike in the Correlates of War (COW) dataset of civil wars, the Uppsala/PRIO dataset does not provide start and end dates of conflicts, making it almost impossible to construct such a measure of civil *conflicts*. However, a robustness check to ensure that the inclusion of ongoing civil conflicts in the coding of the dependent variable that I employ is not driving the results, I employ an onset measure, in which the first year of observed conflict is coded as "1" with all subsequent years of conflict coded as missing, regardless of whether new conflicts began in that period. In this instance, an observation re-enters the dataset when civil conflict is coded as a "0". This is not ideal as the main operationalization of civil conflict because there are many examples of multiple conflicts occurring within the same year. In 1997 India had 8 ongoing violent civil conflicts (Gleditsch et al. 2002), and it is unreasonable to assume that all of them began in the same year. Indeed, Walter (2006) has found that ethnic groups' decisions regarding the initiation of violent self-determination movements is influenced by a large degree by government accommodation of previous armed groups. This suggests that civil conflict may breed more civil conflict, a result that cannot be distinguished without an accurate measure of start and end dates of conflict.

Rather than focusing on all levels of lethal political violence, many empirical studies of civil conflict look at civil wars, conflicts between the state and an internal group with more than 1,000 battle-related deaths. I use the lower threshold of 25 battle deaths in this study because the use of the higher number of battle deaths implies that societal groups have been 'successful' in engaging the government in a protracted military conflict. What this does not necessarily

[88] See Sambanis (2001), Fearon and Laitin (2003), and Hegre and Sambanis (2006) for examples. Elbadawi and Sambanis (2002) and Miguel, Satyanath and Sergenti (2004) are exceptions.

capture, however, is the *attempt* by societal groups to affect political change through political violence. Given the power disparities between the government and most societal groups, an armed rebellion may not be able to sustain a large-scale conflict, while it may be able to sustain a lower level of conflict. Additionally, it is not evident that the political goals of the disaffected groups cannot be accomplished after utilizing a lower level of violence. For these reasons, I do not limit this study to assessing only the impact of demographic pressure on the incidence of civil *wars*. However, in order to situate this study within the larger civil conflict/civil war literature, Appendix B presents the results of a few of the models of this chapter with a new dependent variable, *civil war*. See Appendix B for more details about the coding of this variable and the empirical relationship between demographic pressure and civil war.

5.2.2 Explanatory variables

5.2.2.1 Demographic pressure

Chapter 4 provided a detailed explanation of the various ways to measure this variable, as well as the theoretical justification for utilizing the measure created by factor analysis for the majority of the tests conducted in this chapter. Here, I provide a brief summary of the various measures.

A first set of measures assessed are the individual demographic components mentioned in Chapter 3: population growth, age stratification (measured as the ratio of 15-24 year olds to the total adult population (15-65)), population density, urbanization, and refugees, all divided by the wealth of the state, measured in (logged) gross domestic product (GDP) per capita. Each component was divided by (logged) GDP per capita to capture the fact that not all states can adapt to their demographic profile in the same way. Population growth of 3% may overwhelm

the resources of a poor state, while a wealthier state may accommodate such growth without a negative effect. There is a moderate level of correlation among these 'pressure' variables, however, so including all five of them in a model induces a great deal of multicollinearity, which may obscure the impact of these variables on the likelihood of civil conflict. Additionally, including separate 'pressure' variables fails to account how these factors may combine with the impacts of the others, and it does not provide a parsimonious measure of the concept of demographic pressure.[89]

In an attempt to address some of these limitations, I next created an additive index of demographic pressure. To create this single measure, I dichotomized each 'pressure' component, making it equal "1" if the 'pressure' component was greater than the mean of the sample, and "0" otherwise. Once all five components had been dichotomized, I added the five dummy variables together, creating an index ranging from 0-5, with 0 indicating that the state had no weighted component over the sample mean and 5 indicating that the state was above the mean on all five 'pressure' variables. Table 5.2 presents a tabulation of this variable, including the number of cases as well as the percentage of cases that fall into each category. This table shows that the index of demographic pressure is approximately normally distributed with a slight skew to the right, i.e., there are more observations with 3 or more above average 'pressure' components than there are with two or fewer.

This measure, too, is not without fault, however. First, it is very sample-specific because the criteria for dichotomizing each component is whether the value of the variable is above or below the sample mean. Additionally, adding the dichotomous codings together may not precisely capture the concept of demographic pressure. An additive scale implies that the more

[89] I do include models with these variables in them for completeness purposes, despite my belief that they are not the most theoretically persuasive measurements of the concept of demographic pressure.

of the components a state has, the worse the demographic pressure is. While this makes logical sense, it also obscures the scenario where a state experiences one factor severely but none of the others. This state would have 'less' demographic pressure than a state with slightly more than average values in two categories.

Table 5.2. Tabulation of Demographic Pressure (Index)

Category	Frequency	Percentage
0	42	0.77
1	585	10.69
2	1,749	31.96
3	2,125	38.83
4	824	15.06
5	148	2.70
Total	5,473	100.00

Table 5.3. Tabulation of Demographic Pressure (Factor)

Category	Frequency	Percentage
[min, 25th percentile]	1,369	25.01
(25th percentile, mean]	1,068	19.51
(mean, 75th percentile]	1,667	30.46
(75th percentile, max]	1,369	25.01
Total	5,473	100.00

These limitations led me to use factor analysis to create a measure of demographic pressure. Factor analysis is a technique used by social scientists to extract from a collection of variables the commonalities among them. I was able to draw one factor score from the five 'pressure' components, which I called *demographic pressure*. I rescaled this measure so that the minimum value of the sample equaled "0". The maximum value of this variable is 6.89. It is this measure that I use for the bulk of the analysis in this chapter. Table 5.3 presents a tabulation of the demographic pressure variable created using factor analysis, with observations grouped into four mutually exclusive categories: [min, 25th percentile], (25th percentile, mean],(mean, 75th percentile], and (75th percentile, max]. Between 20-30% of observations fall into each

category, indicating that they are distributed relatively equally across categories, though there are more cases above the mean than below.

5.2.2.2 State wealth

This variable is operationalized as the natural log of the gross domestic product per capita (in 1996 US dollars) of a state. The natural log is employed for two reasons: (1) because the marginal impact of a one dollar increase in GDP per capita for wealthy countries is much less than the same increase in GDP per capita for a poor country; and (2) due to the large variance of this variable, considering the wide disparity among the states in the sample. The data are derived from Gleditsch (2002). Following Fearon and Laitin (2003), I lag this measure one year in an attempt to address potential endogeneity between this measure and civil conflict, i.e., it is possible that civil conflict in year *t* would impact *state wealth* in that year. By lagging this measure one year, the wealth of the state is assessed temporally prior to the observed civil conflict.

5.2.2.3 Level of democracy

This variable, drawn from the Polity IV data set (Polity IV Project), captures the regime type of the country. Originally, it ranged from -10 (completely autocratic) to 10 (completely democratic). Because the relationship between level of democracy and civil conflict is expected to be non-linear, however, the square of this variable must also be included in the models to be tested. Without rescaling the variable, the impact of level of democracy would be assumed to be symmetric (-10*-10 = 10*10). In order to avoid this assumption of symmetry, I added 10 to this variable, creating a new variable which ranges from 0-20 and squared it, to create a second variable which ranges from 0-400.

5.2.2.4 Social cleavages

This concept can be measured in a variety of ways. Fearon and Laitin (2003) assess three separate codings that capture social cleavages within a country. *Ethnic Fractionalization* (EF) addresses the ethnic diversity (or lack thereof) within a state. This variable captures the probability that two randomly selected people from within a country would belong to different ethnic groups, such that low values capture very *homogenous* societies, and high values capture very *diverse* societies. In my sample, this variable ranges from 0.004 to 1. *Number of Languages* measures the number of languages spoken in a country by more than either 1% of the population or 1 million people, whichever is smaller. It ranges from 1-46. Finally, *Religious Fractionalization* (RF) is similar to *Ethnic Fractionalization* as it measures the probability that two randomly drawn people in the country are members of different religions. This variable ranges from 0-0.78.[90]

5.2.2.5 Population (logged)

Many studies of civil conflict have included a variable to account for the size of the country in which the conflict may take place with the belief that larger countries are more prone to civil conflict than smaller countries.[91] Therefore, I include a measure of the population of the state, and due to the large variance of this variable, I incorporate the natural log in the subsequent analysis. Gleditsch (2002) was the source of these data.

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[90] The use of these grievance measures is debated in the literature. What some scholars consider an indicator of fractured societies might also capture tolerant, pluralistic societies. See Fearon and Laitin (2003) and Ellingson (2000) for a taste of this debate.

[91] For example, see Salehyan and Gleditsch (2006); Regan and Norton (2005); Sambanis (2004, 2001); Collier and Hoeffler (2004); Miguel, Styanath and Sergenti (2004); Fearon and Laitin (2003); Elbadawi and Sambanis (2002); de Soysa (2002a).

5.2.2.6 Economic growth

Londregan and Poole (1990) found that economic growth is a good predictor of coups in non-democratic countries, and it is included in this analysis to account for the health of the state's economy. A robust growth rate is welcomed in both poor and wealthy states while poor growth is problematic for both. The indicator employed is the average change in GDP per capita over a three year period (or fewer if data are missing). McDonald (2004) served as the source for these data.

5.2.2.7 Capabilities

Using data from the Correlates of War (COW) project (Singer, Bremer and Stuckey 1972), this variable captures the military capability of the government. States with a large military capacity present a more challenging foe to any internal group which may wish to wrest power or territory from the government than a state with few military resources. A large capability will deter rebel action, while a state with fewer capabilities may have a more difficult time defending itself against internal challengers.

5.2.2.8 Total $trade_{t-1}$

This variable is measured by adding up all the imports into the country and exports from the country and dividing this amount by the gross domestic product of the state. In Gleditsch's (2002) original data, trade was measured in millions of 1996 US dollars. Due to the large variance of this measure, I use the natural log. Finally, I lag this measure one year to avoid the possible endogeneity of trade in $year_t$ being affected by conflict in that year.

5.2.2.9 Time since last conflict

This variable is a count of the number of years since the last civil conflict in the country. It is this variable that is used to create the cubic splines, and together these variables attempt to control for any temporal dependence among observations. In its own right, the longer that has elapsed since the last conflict the less likely civil conflict is expected to be.

Table 5.4 provides a summary of descriptive statistics for all of the variables utilized in the coming models. I did not include the descriptive statistics for the interaction terms (*demographic pressure * variable)* because they do not have any substantive meaning separate from their component parts. The number of observations is equal to that of the sample in which all demographic measures are included, meaning that there were no missing observations on these variables.

Table 5.4. Intra-state Descriptive Statistics

Variable[92]	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Civil Conflict	3978	0.15	0.35	0	1
Population Growth	3978	0.25	0.18	-1.64	1.85
Youth to Adult Ratio	3978	3.79	1.15	1.35	6.35
Population Density	3978	0.45	0.18	-0.0002	0.98
Urbanization	3978	5.29	2.36	0.35	12.33
Refugees	3978	0.63	0.65	0	2.48
Demographic Pressure (Index)	3978	2.72	0.98	0	5
Demographic Pressure (Factor Score)[93]	3978	4.51	0.87	1.68	6.89
State Wealth (logged)$_{t-1}$	3978	8.14	1.03	5.74	10.34
Level of Democracy	3978	10.98	7.55	0	20
Level of Democracy^2	3978	177.47	165.79	0	400
Ethnic Fractionalization	3978	0.48	0.27	0.004	1
Ethnic Fractionalization^2	3978	0.31	0.27	0.000016	1
Number of Languages	3978	7.82	8.00	1	46
Religious Fractionalization	3978	0.37	0.22	0	0.78
Religious Fractionalization^2	3978	0.19	0.17	0	0.61
Economic Growth	3978	1.84	4.18	-28.63	34.28
Population (logged)	3978	16.06	1.46	12.94	20.96
Capabilities	3978	0.007	0.02	0.00002	0.21
Trade/GDP$_{t-1}$	3978	0.25	0.26	0.003	2.96
Time Since Last Conflict	3978	12.82	11.20	0	39

[92] The five 'raw' components (population growth, youth to adult ratio, population density, urbanization, and refugees) were all divided by the natural log of GDP per capita. In addition, population density was logged before being divided by logged GDP per capita. Therefore, it is not possible to back out meaningful values of these variables from these descriptive statistics.

[93] This measure was created with the full sample of cases and rescaled with 0 as the smallest value of this variable. This case, Kuwait 1992, was not included in the analyses in this chapter due to missing values on other independent variables. For this reason, there is not a case in the sample with demographic pressure equal to zero, though that score was empirically possible.

5.3 RESULTS

Model 5.1 in Table 5.5 presents the results of a base model, without any measures of demographic pressure. In this model *population, level of democracy,* and *ethnic fractionalization* are significantly associated with an increase in the likelihood of civil conflict while *capabilities, time since last conflict, total trade, level of democracy (squared), and ethnic fractionalization (squared)* are significantly associated with a decrease in the likelihood of civil conflict.[94] *Economic growth* and *state wealth* are not significant predictors of civil conflict in the base model. The opposite signs of the variables and their squared terms indicate that a non-linear relationship does exist between these variables and civil conflict. As the coefficients for both original variables are positive and the coefficients of their squared terms are negative, this indicates that the relationship resembles and inverted U, such that initially, an increase in the variable of interest increases the probability of civil conflict, until some critical value at which point further increases in that variable are associated with decreasing probabilities of civil conflict.

One final note regarding the base model is the insignificance of *state wealth*. (Logged) GDP per capita is often cited as a consistent (negative) predictor of civil war; however, this variable does not reach statistical significance in this model. Results in Appendix B suggest that this result is not a function of civil conflict (rather than civil war) as the dependent variable. Additionally, alternate specifications of the base model either produced an insignificant result, or the coefficient for *state wealth* was significant and *positive*, a result that is contrary to most

[94] In the base model I include only *ethnic fractionalization* and its squared term due to the correlation among the social cleavage variables, as well as the desire to include the measure and its square to capture a potential non-linear relationship between fractionalization and civil conflict. See Appendix A for further discussion regarding the exclusion of the other social cleavage variables from the base model.

studies.[95] This result is puzzling and will be discussed in more detail in the fourth section of this chapter.

5.3.1 Unconditional hypotheses

Models 5.2-5.6 in Table 5.5 present the impact of the 'pressure' factors separately on the likelihood of civil conflict. Only the youth and density variables achieve statistical significance in their respective models, and urbanization, though statistically insignificant, even has a negative coefficient. While each of the demographic variables represent the pressure associated with that particular demographic component, simply including each factor alone in a model does not inform us about how these factors work together to affect the probability of civil conflict. Therefore, in Model 5.7 in Table 5.6 I include all five 'pressure' components. In this more fully specified model, only age stratification and population density are positive and statistically significant; however, this should not be interpreted as an indication that the other demographic factors are not important in understanding the occurrence of civil conflict. As highlighted in Chapter 4, a few of these measures are highly correlated, and therefore, multicollinearity may be a problem in this model.[96]

[95] The results in this analysis are consistent with Reynal-Querol's (2002) findings in her study of ethnicity and civil conflict. GDP per capita in her models is either statistically insignificant or significant and positive, as will be seen here in later models. Reynal-Querol explains this counter-intuitive result as a function of possible collinearity between GDP per capita and a measure of educational attainment. Collinearity may also be a problem here.

[96] Notice that *urbanization* and *refugees* have flipped signs from Models 5.5 and 5.6, respectively, though neither measure is statistically significant.

Table 5.5. Impact of Demographic Factors on Civil Conflict

	Model 5.1	Model 5.2	Model 5.3	Model 5.4	Model 5.5	Model 5.6
Constant	-9.01* (1.39)	-9.53* (1.44)	-16.37* (2.07)	-12.11* (1.51)	-9.32* (1.57)	-8.94* (1.41)
Population (logged)	0.49* (0.07)	0.49* (0.07)	0.47* (0.07)	0.36* (0.07)	0.49* (0.07)	0.48* (0.07)
Capabilities	-27.90* (6.24)	-26.65* (6.05)	-19.05* (4.55)	-25.14* (6.32)	-28.14* (6.24)	-27.82* (6.25)
Economic Growth	0.002 (0.01)	-0.002 (0.01)	0.002 (0.02)	-0.006 (0.02)	0.001 (0.01)	0.003 (0.01)
Time Since Last Conflict	-1.84* (0.12)	-1.83* (0.12)	-1.77* (0.12)	-1.76* (0.12)	-1.84* (0.12)	-1.84* (0.12)
Total Trade$_{t-1}$	-2.01* (0.58)	-1.97* (0.60)	-1.89* (0.61)	-2.73* (0.61)	-1.93* (0.59)	-2.05* (0.59)
State Wealth$_{t-1}$	0.13 (0.11)	0.18 (0.11)	0.75* (0.16)	0.56* (0.13)	0.17 (0.14)	0.14 (0.11)
Level of Democracy	0.15* (0.05)	0.15* (0.05)	0.12* (0.05)	0.20* (0.05)	0.15* (0.05)	0.15* (0.05)
Level of Democracy (squared)	-0.006* (0.002)	-0.006* (0.002)	-0.0045 (0.0025)	-0.009* (0.003)	-0.007* (0.002)	-0.006* (0.002)
Ethnic Fractionalization	3.45* (1.13)	3.29* (1.13)	2.75* (1.153)	3.89* (1.12)	3.54* (1.16)	3.50* (1.14)
Ethnic Fractionalization (squared)	-2.65* (1.16)	-2.62* (1.15)	-2.18 (1.17)	-2.18 (1.17)	-2.75* (1.18)	-2.71* (1.16)
Population Growth		0.70 (0.51)				
Youth to Adult Ratio			0.72* (0.15)			
Population Density				2.98* (0.55)		
Urbanization					-0.02 (0.04)	
Refugees						0.05 (0.11)
N	4054	4010	4024	3978	4010	4054
Chi-square	961.43*	950.87*	955.18*	914.25*	958.08*	960.41*
Pseudo R^2	0.5683	0.5676	0.5726	0.5673	0.5670	0.5684

Dependent variable is *Civil Conflict*. Cell entries are logistic estimates with robust standard errors in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

Table 5.6. Impact of Demographic Pressure on Civil Conflict

	Model 5.7	Model 5.8	Model 5.9	Model 5.10
				DV=civil conflict onset
Constant	-19.73* (2.39)	-9.80* (1.37)	-18.86* (2.72)	-18.17* (3.84)
Population (logged)	0.33* (0.07)	0.42* (0.07)	0.47* (0.06)	0.44* (0.08)
Capabilities	-15.43* (4.52)	-23.72* (6.08)	-20.48* (4.52)	-17.84* (6.28)
Economic Growth	-0.01 (0.02)	-0.001 (0.01)	-0.01 (0.01)	-0.02 (0.02)
Time Since Last Conflict	-1.69* (0.12)	-1.78* (0.12)	-1.78* (0.12)	-0.04 (0.06)
Total Trade$_{t-1}$	-2.72* (0.64)	-2.29* (0.61)	-1.89* (0.60)	-2.33* (0.91)
State Wealth$_{t-1}$	1.20* (0.21)	0.28* (0.11)	0.86* (0.19)	0.46 (0.27)
Level of Democracy	0.17* (0.05)	0.19* (0.05)	0.17* (0.05)	0.26* (0.08)
Level of Democracy (squared)	-0.008* (0.003)	-0.008* (0.003)	-0.007* (0.003)	-0.01* (0.004)
Ethnic Fractionalization	3.00* (1.18)	3.02* (1.12)	3.24* (1.13)	2.70 (1.72)
EF (squared)	-1.52 (1.22)	-2.16 (1.14)	-2.62* (1.16)	-1.78 (1.72)
Demographic variables (H1)				
Population Growth	0.44 (0.50)			
Youth to Adult Ratio	0.71* (0.16)			
Population Density	3.12* (0.56)			
Urbanization	0.01 (0.05)			
Refugees	-0.04 (0.12)			
Demographic Pressure (Index)		0.25* (0.07)		
Demographic Pressure (Factor)			0.92* (0.22)	0.72* (0.33)
N	3978	3978	3978	3506
Chi-square	926.74*	910.54*	951.95*	127.13*
Pseudo R^2	0.5738	0.5618	0.5634	0.1067

Dependent variable is *Civil Conflict* unless otherwise noted. Cell entries are logistic estimates with robust standard errors in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

Model 5.8 presents the results using the index of demographic pressure. In this model, *demographic pressure (index)* is positive and statistically significant, indicating that the more components within a country that are above average, the more likely that state is to experience civil conflict. In Model 5.9, I introduce the measure of *demographic pressure* that was created using factor analysis, and which will be utilized in the remaining models in this study. The coefficient for *demographic pressure (factor)* is positive and statistically significant, lending support to H1 which posited that demographic pressure unconditionally increases the likelihood of civil conflict.[97]

Though the coefficient for *demographic pressure* is statistically significant, some may argue that its substantive impact on the occurrence of civil conflict may be negligible. Table 5.7 presents the impact of demographic pressure on the probability of civil conflict over various levels of demographic pressure. The first column of Table 5.7 reports the probability of civil conflict as well as the percentage change in the probability from the minimum value of demographic pressure. For the purpose of these calculations, all variables were set at their mean value, except for the square of *level of democracy* which is set at 121 (the square of the mean of *level of democracy*) and the square of *ethnic fractionalization* which was set to 0.23 which corresponds to the square of the mean of *ethnic fractionalization*.

With *demographic pressure* set at its minimum value, the probability of civil conflict is 0.67%. However, when this variable is increased from its minimum value to its value at the 25th percentile, with all the other variables held constant, the probability of civil conflict increases by over 400% to 3.42%. Increasing *demographic pressure* to its mean increases the probability of

[97] This model was also re-estimated using the factor analysis measure created from the 'raw' demographic indicators (see Chapter 4 for a description of this variable). The use of this variable did not substantively change the impact of demographic pressure, nor did its inclusion change the sign or significance of any of the included control variables.

civil conflict to 6.89%. Two-thirds of the civil conflicts in the dataset, however, occur when *demographic pressure* is greater than the mean value (385 of 579 conflicts).[98] This is unsurprising, however, given the relatively high probability of civil conflict at the 75th percentile (12.29%) and maximum value (40.09%) of *demographic pressure*. Indeed, when *demographic pressure* is at its maximum value in the dataset, a civil war occurred in the country with this value (Rwanda 1998). The second column of Table 5.7 reports the change in the predicted probability of civil conflict from the mean value, an alternate way of assessing the substantive impact of demographic pressure. Though not as dramatic as a 5000% increase in predicted probability from minimum to maximum values of *demographic pressure*, the increase in predicted probability from the mean to larger values does underscore the substantive impact of this variable.

In addition to the changes in the predicted probability of civil conflict given changes in *demographic pressure*, the substantive significance of demographic pressure can be assessed through the examination of the proportional reduction in error (PRE) exhibited by the model which includes this variable. If one were to predict the modal category (no civil conflict) for each observation, she would be correct for approximately 85% of the observations. Model 5.9 predicts over 94% of observations correctly, giving a PRE of 61.83%. This result combined with the results presented in Table 5.7 provide evidence that not only is the impact of *demographic pressure* on the occurrence of civil conflict statistically significant but substantively significant as well, lending additional support to H1.

[98] Thirteen percent of civil conflicts occur between the minimum and 25th percentile of *demographic pressure*, 20% between the 25th percentile and the mean, 42% between the mean and 75th percentile, and 24% between the 75th percentile and the maximum value.

Table 5.7. Predicted Probability of a Civil Conflict

Model Parameters[a]	*% Probability of Civil Conflict (Change from minimum value)*	*Change from mean value of demographic pressure*
Demographic pressure at minimum value	0.67	-90%
Demographic pressure at 25th percentile	3.42 (+410%)	-50%
Demographic pressure at mean	6.89 (+928%)	------
Demographic pressure at 75th percentile	12.29 (+1734%)	+78%
Demographic pressure at maximum value	40.09 (+5884%)	+482%

[a] Continuous variables are set at their mean value, except the square of *Level of Democracy* which is set at 121, the square of the mean of *Level of Democracy* (11), and *Ethnic Fractionalization (squared)* which is set at 0.31, the square of the mean of *Ethnic Fractionalization* (0.48).

A final specification of the unconditional model is provided in Model 5.10 of Table 5.6 to check the robustness of the *demographic pressure* result given a change in the dependent variable. To review, the dependent variable which was utilized in Models 5.1-5.9 is civil conflict occurrence, which includes both conflict onset and ongoing conflicts. For Model 5.10 I change the dependent variable to *civil conflict onset*. As discussed earlier in the chapter, there are flaws to this specification of the dependent variable because the imprecision of the Uppsala/PRIO data set in terms of start and end dates of conflicts which prevents me from coding this variable in a similar manner to those used in studies of civil war onset. Still, this variable does roughly capture the onset of civil conflict within a country, though it cannot account for the onset of new conflicts after the initial conflict unless there has been a period of no lethal conflicts in between.

With this new specification, Model 5.10 illustrates that the coefficient for *demographic pressure* remains positively signed and statistically significant, though the magnitude of the effect is somewhat attenuated.

The control variables in this model perform relatively consistently with previous model specifications with a few notable exceptions. First, in the previous nine models, one if not both of the *Ethnic Fractionalization* variables were significant, indicating that a statistical relationship exists between a state's ethnic composition and its proclivity for civil conflict. In Model 5.10, however, neither variable is statistically significant. This is interesting to note because this result is consistent with Fearon and Laitin's (2003) finding when assessing the predictors of civil *war* onset, however it is at odds with others' findings that ethnic fractionalization positively impacts the likelihood of civil war onset (Collier and Hoeffler 2004, Regan and Norton 2005, and Sambanis 2001). Second, the measure of state wealth is insignificant in Model 5.10, while in many of the previous models it was a positive predictor of civil conflict, a result which is contrary to theoretical expectations. Finally, *time since last conflict* is also insignificant in this model though it has been a robust predictor of a reduced likelihood of civil conflict in all the previous models. This is most likely due to the missing observations during a civil conflict, the exclusion of which makes it appear as if there are fewer years between civil conflict onsets than there actually are.

The models presented in this section tested the link between demographic pressure and civil conflict occurrence with a robustness check to highlight that demographic pressure is also a significant predictor of civil conflict onset, not simply civil conflict occurrence. The two composite measures of demographic pressure performed consistently with the empirical expectations of H1, and the predicted probabilities in Table 5.7 and the PRE indicate that H1

receives a considerable amount of support from this analysis. In the next section I will test the conditional hypotheses specifying the conditions under which demographic pressure increases the likelihood of civil conflict.

5.3.2 Conditional hypotheses

The remaining hypotheses regarding the relationship between demographic pressure and civil conflict are conditional hypotheses, meaning that the impact of demographic pressure depends on the value of some other variables in the model. Tables 5.8 and 5.9 present the results of the tests of these hypotheses.

Table 5.8. Conditional Impact of Demographic Factors on Civil Conflict

	Model 5.11	Model 5.12
Constant	-17.94* (4.95)	-21.32* (3.16)
Population (logged)	0.47* (0.06)	0.47* (0.07)
Capabilities	-20.36* (4.54)	-21.16* (4.37)
Economic Growth	-0.009 (0.02)	-0.01 (0.02)
Total Trade$_{t-1}$	-1.85* (0.62)	-2.22* (0.64)
Time Since Last Conflict	-1.78* (0.12)	-1.77* (0.12)
State Wealth$_{t-1}$	**0.75** **(0.52)**	0.89* (0.19)
Level of Democracy	0.17* (0.06)	**0.36** **(0.37)**
Level of Democracy (squared)	-0.007* (0.003)	**-0.009** **(0.02)**
Ethnic Fractionalization	3.21* (1.14)	3.34* (1.14)
Ethnic Fractionalization (squared)	-2.59* (1.18)	-2.70* (1.17)
Demographic Pressure	**0.74** **(0.86)**	**1.34*** **(0.37)**
*Demographic Pressure * Wealth*	**0.02** **(0.10)**	
*Demographic Pressure * Level of Democracy*		**-0.03** **(0.08)**
*Demographic Pressure * Level of Democracy (squared)*		**0.00002** **(0.003)**
N	3978	3978
Chi-square	958.64*	945.83*
Pseudo R^2	0.5634	0.5647

Dependent variable is *Civil Conflict*. Cell entries are logistic estimates with robust standard errors in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

5.3.2.1 State wealth

H2 posits that the impact of demographic pressure on civil conflict is expected to be high for poor countries and decrease as wealth increases. Model 5.11 introduces the interaction

between *state wealth* and *demographic pressure* to test H2. To find empirical support for this hypothesis, the coefficient for *demographic pressure* is expected to be positive, the coefficient for *state wealth* is expected to be negative, and the interaction between these two variables (*demographic pressure*state wealth*) is expected to be negative. As seen in Model 5.11 in Table 5.8, several of these expectations are not confirmed. None of the three variables of interest in this model (those in bold numbering) is statistically significant. Additionally, all three variables are positively signed. Because of the interaction term, the coefficients of *demographic pressure* and *state wealth* must be interpreted carefully. The coefficient for *demographic pressure* suggests that when *state wealth* has the value of zero (an empirical impossibility – a state cannot have zero wealth), the impact of *demographic pressure* is not statistically distinguishable from zero. Similarly, when *demographic pressure* equals zero (which is theoretically possible, but is not empirically possible in this sample), the impact of *state wealth* is not distinguishable from zero. The insignificance of the interaction between *demographic pressure* and *state wealth* implies that as state wealth increases, the impact of demographic pressure increases, but this rate of change is not significant enough to distinguish this impact from a horizontal line. Figure 5.1 graphically presents these results.

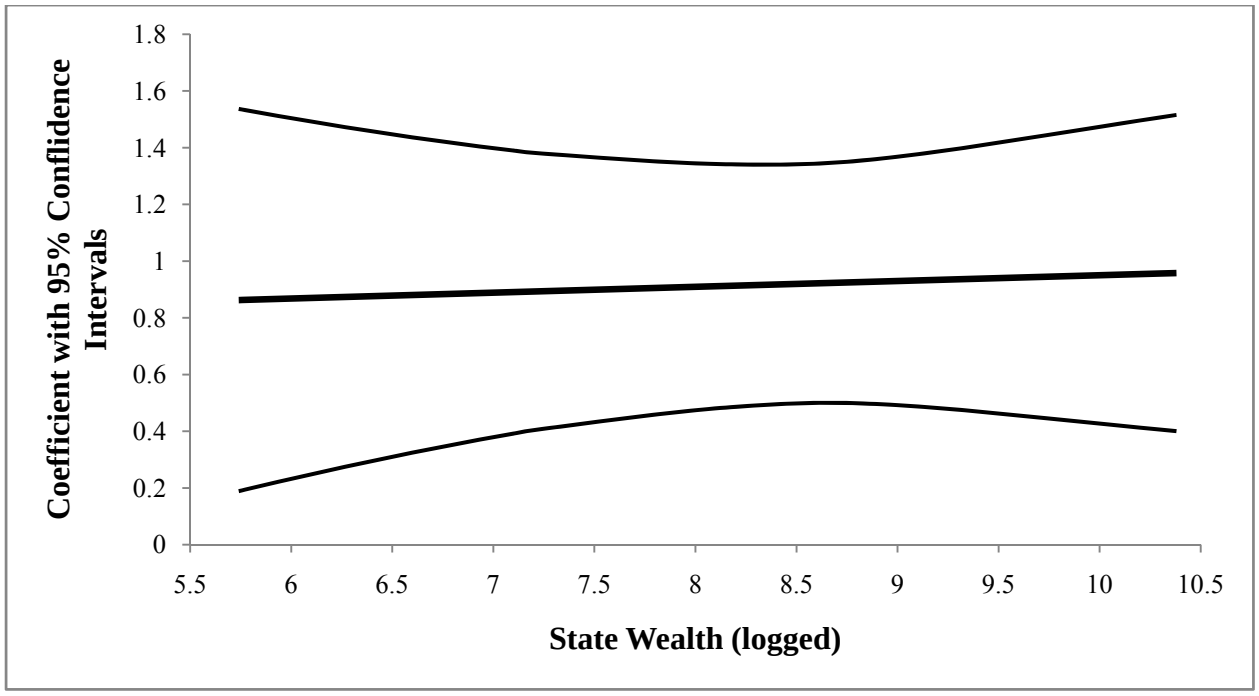

Figure 5.1. Impact of Demographic Pressure Conditioned on State Wealth

In Figure 5.1 the coefficient of *demographic pressure* is graphed across various levels of the natural log of GDP per capita. Across the entire range of *state wealth*, the impact of demographic pressure while significant (as indicated by the 95% confidence intervals), is virtually flat as indicated by the insignificant coefficient for the interaction term. H2 hypothesized that the impact of demographic pressure would decrease as income increased, a proposition that is not supported by Model 5.11 or Figure 5.1.

5.3.2.2 Level of democracy

Many scholars of civil conflict have found that the relationship between the level of democracy and civil conflict is non-linear suggesting that those states with characteristics of both democracies and autocracies (anocracies) are the most risk for civil conflict (Fearon and Laitin 2003, Mousseau 2001). H3 posited that the impact of demographic pressure would also increase as the level of democracy increased and then decrease at higher levels of democracy. Model

5.12 in Table 5.8 tests this hypothesis. Because *level of democracy* is expected to have a non-linear impact on the probability of civil conflict, *demographic pressure* must be interacted with both *level of democracy* and its squared term. The inclusion of additional interaction terms can complicate the interpretation of the results.

Of the five variables of interest in Model 5.12, only *demographic pressure* is statistically significant, indicating that when *level of democracy* is equal to zero (complete autocracy), the impact of *demographic pressure* is positive and statistically distinguishable from zero. The positive value of the *level of democracy* coefficient, and the negative sign of the coefficient of the squared term indicate that the non-linear relationship between *level of democracy* and civil conflict is still evident, however, the inverted-U is flat and indistinguishable from zero, *when demographic pressure is equal to zero*. (See Figure 5.3, which will be explained in detail shortly.) The insignificance of the two interaction terms, and the extremely small value of the coefficient for the interaction including the squared term, suggests on its face that the impact of *demographic pressure* is not conditioned on *level of democracy*. This, however, is not quite accurate.

Figure 5.2 graphs the impact of demographic pressure across varying levels of democracy. The impact of democracy is significant for the entire range of the variable, as the 95th confidence intervals never overlap zero; however, this impact appears to be linear, rather than non-linear as suggested by the hypothesis. However, this figure does not tell the entire story. Figure 5.3 presents the probability of civil conflict across *level of democracy* for different values of *demographic pressure*. As indicated by the insignificance of *level of democracy* and its squared term in Model 5.12, the predicted probability line closest to the X-axis (which corresponds to demographic pressure at its minimum value) is basically a horizontal line. As the

value of *demographic pressure* increases, however, the predicted probability of civil conflict begins to exhibit non-linear characteristics across the value of *level of democracy*. When *demographic pressure* is assessed at its 75th and 95th percentiles, the non-linearity of the relationship is quite pronounced. Table 5.9 illustrates that there are quite a few anocracies fall into these high ranges of demographic pressure.[99]

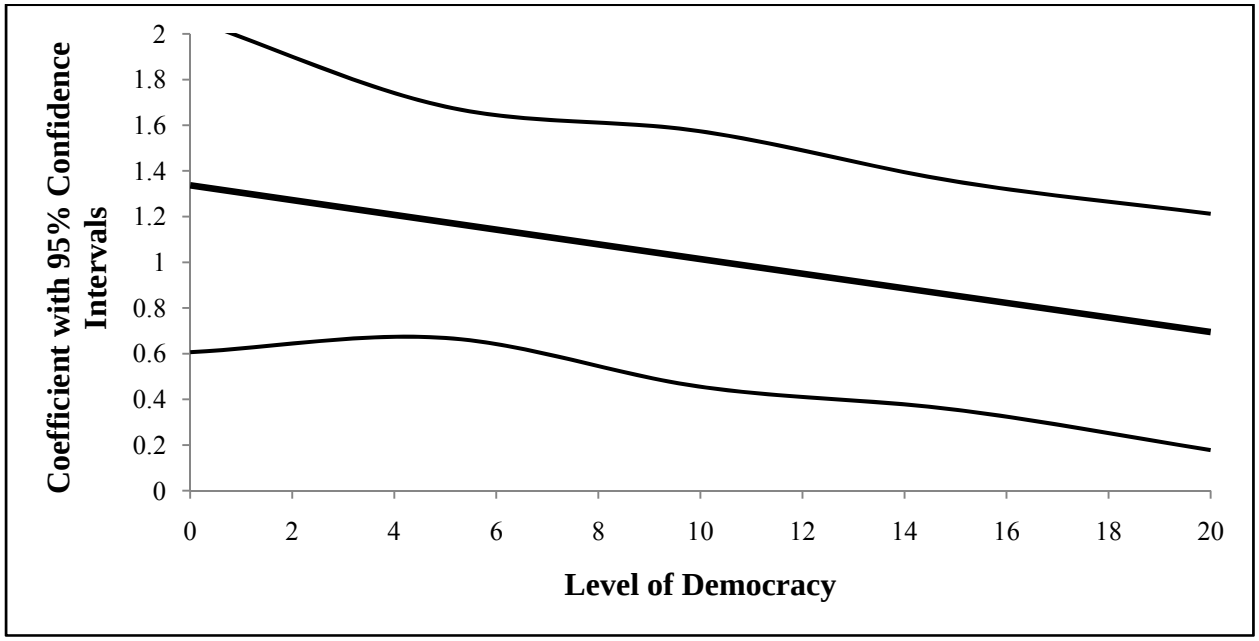

Figure 5.2. Impact of Demographic Pressure Conditioned on Level of Democracy

[99] There are also a large number of autocracies experiencing demographic pressure. Figure 5.3 shows that these countries have a greater likelihood of civil conflict than other autocracies with less demographic pressure; however, anocracies have a higher risk of civil war than autocracies with the *same* amount of demographic pressure.

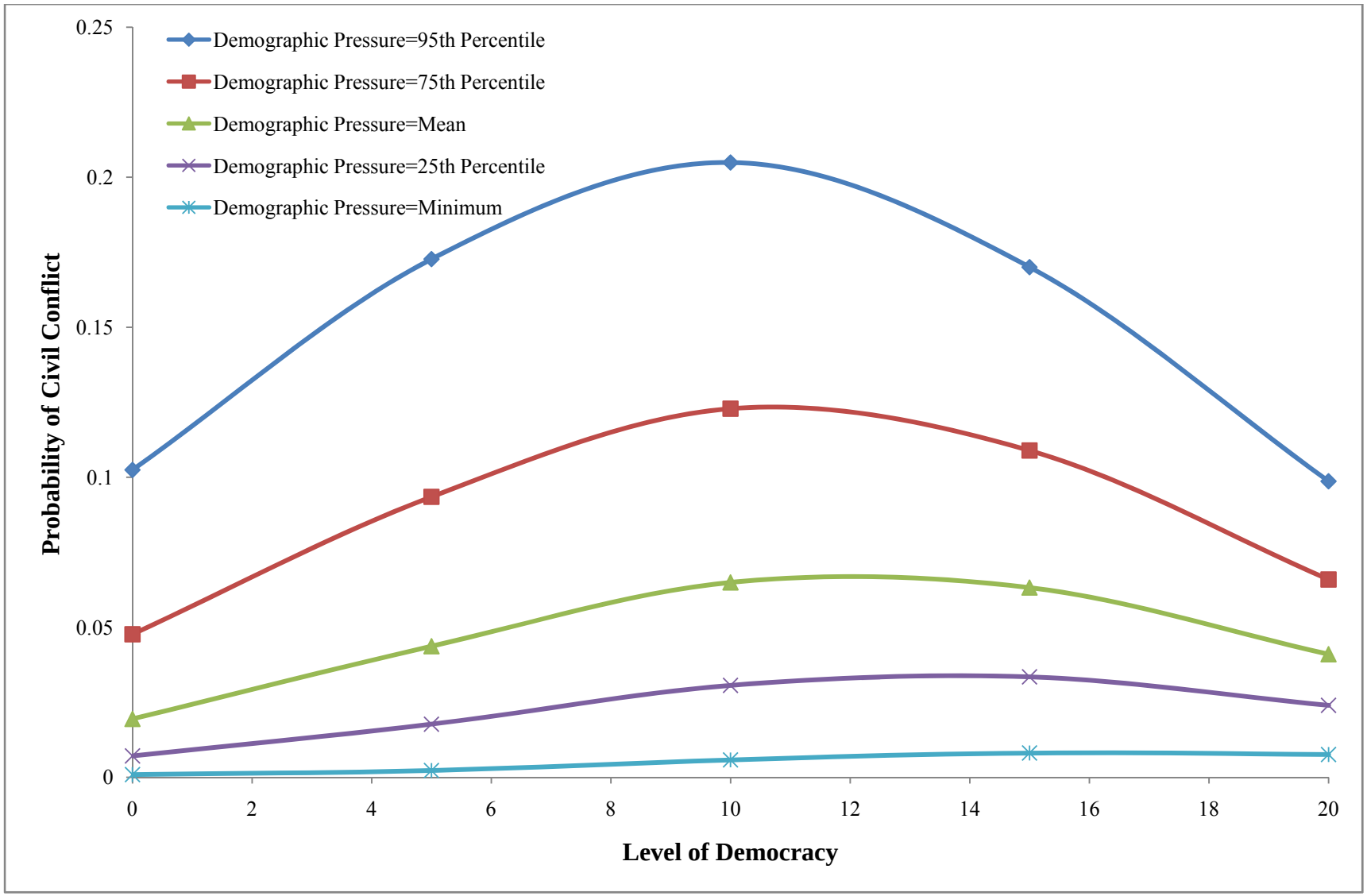

Figure 5.3. Probability of Civil Conflict at Various Levels of Democracy and Demographic Pressure

Figure 5.3 presents a more nuanced relationship among *demographic pressure*, *level of democracy* and civil conflict than is suggested by the significance of the coefficients in Model 5.12. A non-linear relationship between *level of democracy* and civil conflict is not apparent at low levels of *demographic pressure*, however, at high levels, this non-linear relationship is quite pronounced. From this I can conclude that anocracies with high levels of demographic pressure are in greater danger of civil conflict than their counterparts in democracies and autocracies, a conclusion that supports the spirit of H3, even if the initial empirical results suggest otherwise.

Table 5.9. Tabulation of Demographic Pressure Versus Regime Type

Category	Autocracies	Anocracies	Democracies
[min, 25th percentile]	101	81	896
(25th percentile, mean]	155	183	334
(mean, 75th percentile]	640	327	321
(75th percentile, max]	565	240	135
Total	1,461	831	1,686

*Autocracies are those countries which score less than -5 on the Polity scale (0-4 in this analysis); anocracies score between -5 and 5 (5-15); democracies score greater than or equal to 6 (16-20).

5.3.2.3 Social Cleavages

Social cleavages are expected to generate grievances among members of society if goods and services are distributed based on such cleavages and some groups do not receive equal treatment. In this study, the three cleavages I investigate are ethnic, linguistic and religious differences within a country.[100] As demographic pressure is also an indicator of possible grievances within a country, the presence of both of these factors is expected to increase the likelihood of civil conflict beyond the additive impact of each factor separately; thus, a

[100] In the previous models, I utilized only a control of ethnic fractionalization; however, other authors have investigated ethnic, linguistic and religious differences in explaining civil conflict (Fearon and Laitin 2003; Ellingsen 2000). Therefore, to test a social cleavage/demographic pressure interaction hypothesis, I reintroduce all three measures of social cleavage and test all of their impacts on civil conflict. See Appendix A for a discussion about why all three measures are not utilized together as controls in the same model in this chapter.

conditional hypothesis was proposed suggesting that the impact of demographic pressure is dependent on the amount of social cleavage within the country.

This multiplicative relationship is not straightforward, however, because ethnic, linguistic or religious diversity is not necessarily an inherently conflictual situation. In many countries, such diversity is embraced and indicates a high level of tolerance and pluralism. In such societies, similar to homogenous societies, civil conflict is not predicted. Because it is not always possible to observe discrimination based on identity characteristics, I will proxy the grievances as a result of discrimination by the fractionalization of society. Therefore, the impact of demographic pressure is expected to increase as cleavages increase from low to medium levels (from a homogenous culture to a society with many different groups) and then decrease. The exception to this non-linear impact is when the cleavage is defined along linguistic lines. The more languages that are present within a country, the more problematic service provision, especially education, becomes. Therefore, a linear impact of demographic pressure conditioned on the number of languages is expected to be linear.

Table 5.10. Impact of Demographic Factors on Civil Conflict Conditioned on Social Cleavages

	Model 5.13	Model 5.14	Model 5.15	Model 5.16	Model 5.17
Constant	-24.89* (3.07)	-19.90* (2.80)	-20.51* (2.80)	-20.17* (2.73)	-25.73* (3.34)
Population (logged)	0.47* (0.06)	0.45* (0.07)	0.50* (0.07)	0.51* (0.07)	0.53* (0.07)
Capabilities	-21.17* (4.02)	-30.24* (7.01)	-31.48* (6.84)	-26.58* (5.57)	-28.09* (5.69)
Economic Growth	-0.01 (0.01)	-0.01 (0.02)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Total Trade$_{t-1}$	-2.04* (0.61)	-2.46* (0.64)	-2.37* (0.64)	-1.82* (0.59)	-2.12* (0.61)
Time Since Last Conflict	-1.76* (0.12)	-1.76* (0.12)	-1.74* (0.12)	-1.76* (0.12)	-1.74* (0.12)
State Wealth$_{t-1}$	0.79* (0.19)	1.10* (0.20)	0.95* (0.21)	0.92* (0.19)	0.97* (0.19)
Level of Democracy	0.17* (0.05)	0.22* (0.05)	0.20* (0.05)	0.17* (0.05)	0.16* (0.05)
Level of Democracy (squared)	-0.01* (0.003)	-0.01* (0.003)	-0.01* (0.003)	-0.01* (0.003)	-0.01* (0.003)
Ethnic Fractionalization	**32.83*** **(6.75)**				
Ethnic Fractionalization (squared)	**-28.05*** **(7.08)**				
Languages		0.04* (0.01)	**0.30*** **(0.07)**		
Religious Fractionalization				5.04* (1.46)	**35.91*** **(9.95)**
Religious Fractionalization (squared)				-5.86* (1.83)	**-43.25*** **(11.86)**
Demographic Pressure	**2.37*** **(0.39)**	0.89* (0.22)	**1.10*** **(0.23)**	0.95* (0.21)	**2.05*** **(0.44)**
*Demographic Pressure * Ethnic Fractionalization*	**-6.51*** **(1.49)**				
*Demographic Pressure * Ethnic Frac. (squared)*	**5.57*** **(1.48)**				
*Demographic Pressure * Languages*			**-0.05*** **(0.01)**		
*Demographic Pressure * Religious Fractionalization*					**-6.68*** **(2.14)**
*Demographic Pressure * Religious Frac. (squared)*					**8.04*** **(2.55)**
N	3978	3978	3978	3978	3978
Chi-square	913.27*	907.19*	883.71*	934.26*	905.97*
Pseudo R^2	0.5681	0.5656	0.5697	0.5641	0.5672

Dependent variable is *Civil Conflict*. Cell entries are logistic estimates with robust standard errors in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

Ethnic fractionalization (EF)

Table 5.10 reports the results for the tests of the social cleavage hypotheses. In the first column (Model 5.13), the interaction between *demographic pressure* and *ethnic fractionalization* is explored. Because ethnic fractionalization is represented by both a variable and its interaction, *demographic pressure* had to be interacted with both of these variables. This greatly complicates the interpretation of the coefficients for the component and interactive variables. First, I will begin with the component variables. In Model 5.13 the coefficient of *demographic pressure* is positive and statistically significant, indicating that when *ethnic fractionalization* equals zero (when a society is completely homogeneous), *demographic pressure* is expected to exert a positive impact on the likelihood of civil conflict. Similarly, *ethnic fractionalization* is also positive and statistically significant; when *demographic pressure* equals 0 (lowest demographic pressure, as defined by the larger sample), the impact of ethnic fractionalization is positive. The finding that *ethnic fractionalization (squared)* is negative and statistically significant supports the notion that there is a non-linear relationship between ethnic fractionalization and civil conflict. Put together with the non-squared measure, when *demographic pressure* equals zero, increasing amounts of fractionalization lead to an increased probability of civil conflict until a threshold value as which the probability to civil conflict begins to decline.

The findings are complicated, however, when the interaction terms are assessed. *Demographic Pressure*Ethnic Fractionalization* is negative and statistically significant, while the other interaction term is positive and statistically significant. Combined with the previously discussed results for the component parts of the interaction, these results indicate that as *ethnic fractionalization* increases, the impact of *demographic pressure* decreases until some threshold at which it begins to increase. This result is counter to the hypothesized relationship among

these variables. Figure 5.4 illustrates the impact of *demographic pressure* conditioned on *ethnic fractionalization*.

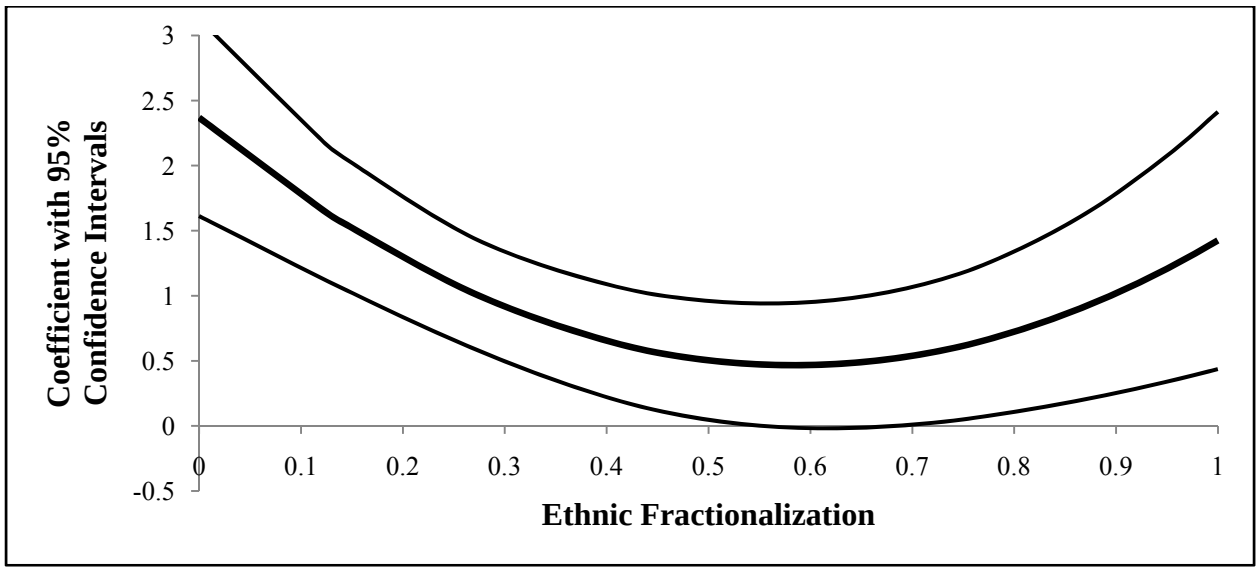

Figure 5.4. Impact of Demographic Pressure Conditioned on Ethnic Fractionalization

Before moving on to other types of social cleavage, it may be useful to analyze how the probability of conflict changes across various levels of *demographic pressure* and *ethnic fractionalization*. Figure 5.5 presents such an analysis. At lower levels of demographic pressure, the probability of civil conflict increases as *ethnic fractionalization* increases until approximately 0.55 at which point the probability of civil conflict declines. When *demographic pressure* is at the 75th percentile or above, however, the probability of civil conflict *decreases* as *ethnic fractionalization* increases to approximately 0.6 and then it begins to *increase*. When *demographic pressure* is at its maximum value (not shown), this relationship is especially pronounced. This more nuanced presentation of the results suggests that for lower levels of *demographic pressure*, the relationship between *ethnic fractionalization* and civil conflict exhibits the expected inverted-U shape; however this relationship is reversed at higher levels of *demographic pressure.* As H4a proposed that the inverted-U relationship should be especially pronounced at high levels of demographic pressure, Figure 5.5 illustrates that H4a is not

supported by this analysis. These relationships have not been addressed to a large degree in previous literature, and are due for more exploration, a task which must be deferred to a later project due to space limitations. However, a more thorough discussion of these results is provided in the discussion section of this chapter.

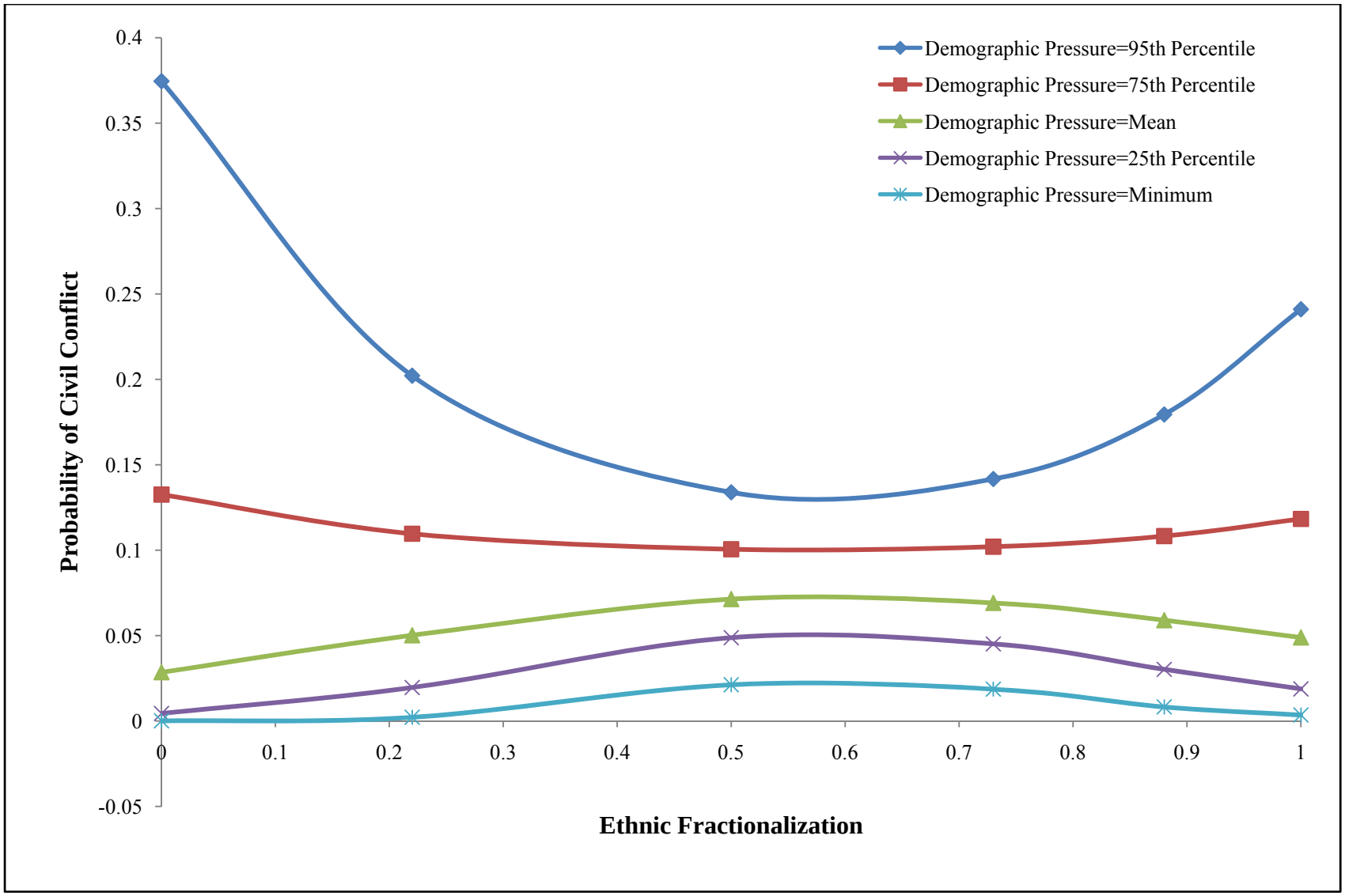

Figure 5.5. Probability of Civil Conflict at Various Levels of Ethnic Fractionalization and Demographic Pressure

Number of languages

Unlike ethnic fractionalization, the number of languages is expected to have a linear relationship with civil conflict, a relationship that should continue to hold as it conditions demographic pressure. Therefore, no squared term is utilized in Model 5.14 in Table 5.10, which replaces the *ethnic fractionalization* variables with *number of languages*. In this model, both *demographic pressure* and *number of languages* are positive and statistically significant, indicating that the unconditional impact of each variable increases as that variable increases, holding all other variables constant. The social cleavage hypothesis for languages suggests that conditional on the number of languages within a country, the impact of demographic pressure is expected to increase because of the positive interaction between two different measures of grievances. Model 5.15 presents results to this test.

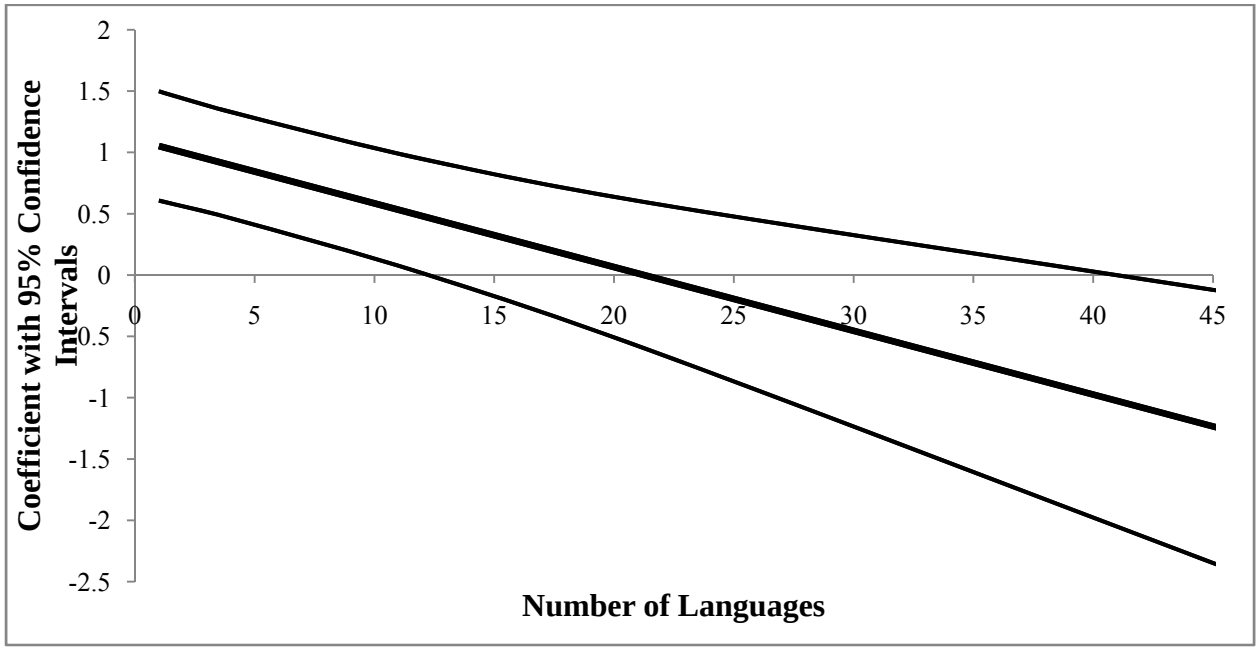

Figure 5.6. Impact of Demographic Pressure Conditioned on Number of Languages

In Model 5.15 number of languages is positive and statistically significant, indicating that when demographic pressure is zero, more languages are associated with a higher probability of

civil conflict. Similarly, demographic pressure is positive and statistically significant, suggesting that when number of languages equals zero (which is not possible), demographic pressure is expected to increase the probability of civil conflict. The interaction between these two variables, however, is negative and statistically significant, suggesting that as the number of languages increases, the impact of demographic pressure decreases, which is a result counter to the proposed hypothesis (H4b). Figure 5.6 highlights this relationship. In this figure the impact of demographic pressure is positive and statistically distinguishable from zero when the number of languages within a country is low; however, as the number of languages within a country increases, the impact of demographic pressure decreases, as indicated by the negatively sloping line. The decreasingly significant impact becomes indistinguishable from zero when there are approximately 12 languages within a country. Between 12-40 languages the impact of demographic pressure is not distinguishable from zero. As India is the only country in the sample with more than 22 languages, it may seem unnecessary to include such a large number of languages in this figure. However, we observe that when the number of languages exceeds 40 (i.e., for India), the impact of demographic pressure is actually negative, i.e., conflict reducing.

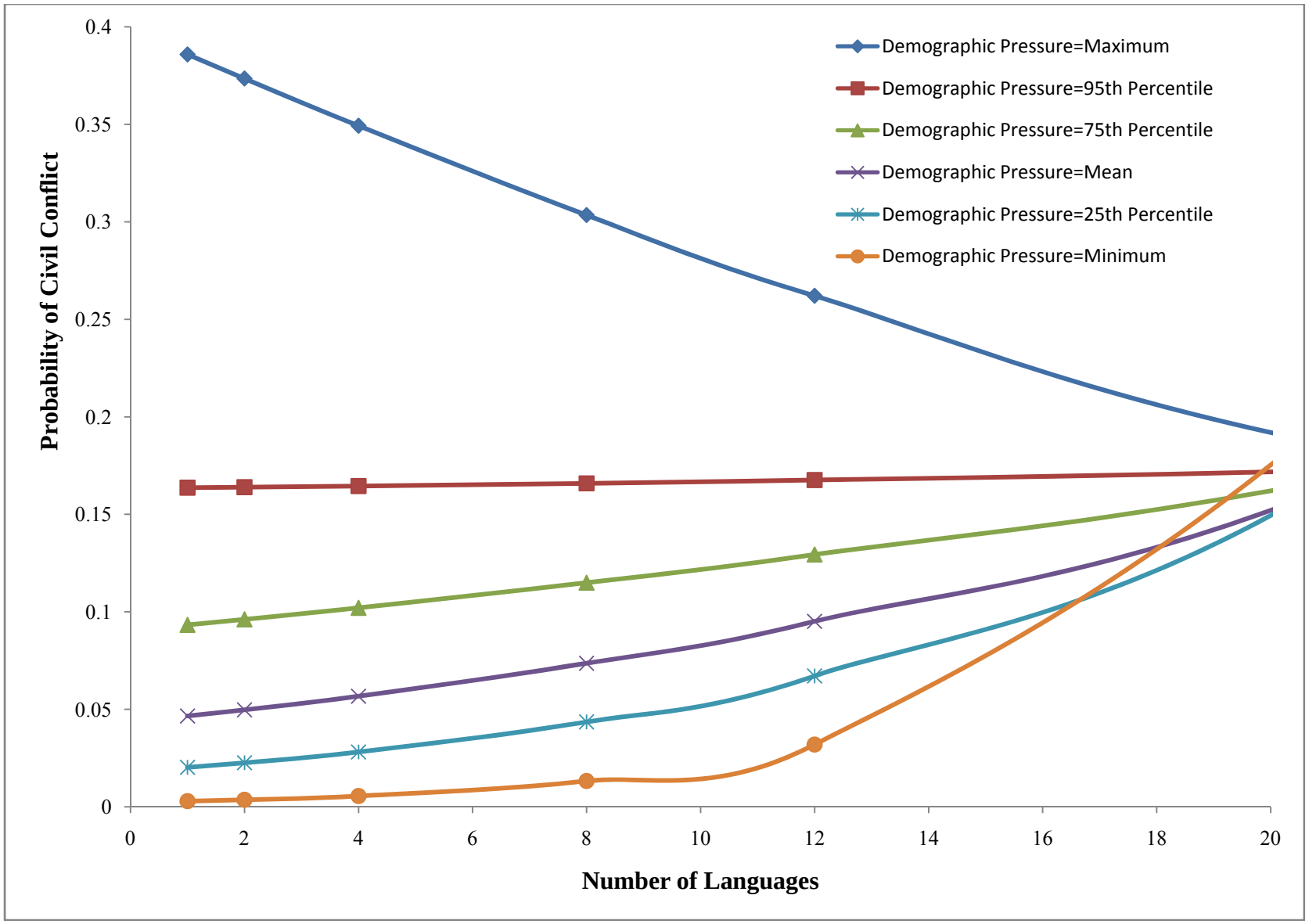

Figure 5.7. Probability of Civil Conflict at Various Levels of Demographic Pressure and Numbers of Languages

Figure 5.7 attempts to tease out these relationships more by presenting the probability of conflict for different levels of *demographic pressure* across various numbers of languages. For all but the maximum amount of demographic pressure, the probability of civil conflict increases as the number of languages increases; however, this rate of increase is smaller as the amount of demographic pressure increases until finally, when *demographic pressure* is at its maximum value, the probability of civil conflict decreases as the number of languages increases.[101] This illustration confirms that the language hypothesis is not supported by Model 5.15, and it presents a counter-intuitive result. Perhaps it can be explained by the notion that when demographic pressure is present in a society, all groups are affected, which may actually *reduce* the grievances between them. It is possible that it is only when demographic pressure is low and resources are more abundant that competing groups observe differential treatment.

Religious fractionalization

The final social cleavage variable to be assessed is religious fractionalization, which measures the probability that two randomly selected people in a country are from different religious groups. Like the ethnic fractionalization hypothesis, religious fractionalization is expected to increase the impact of demographic pressure because of the presence of two paths to grievance within the community. Also like ethnic fractionalization, however, this hypothesis is not supported by the evidence.

Model 5.16 in Table 5.10 presents Model 5.9 with *religious fractionalization* replacing *ethnic fractionalization*. Because of the suspected non-linear relationship between *religious fractionalization* and civil conflict, a square term is also present in this model. The measure of

[101] The model does not change dramatically if India is excluded as an outlier.

RF is positive and statistically significant while the squared term is negative and significant, suggesting that there is indeed a non-linear relationship between RF and civil conflict. Additionally, the measure of demographic pressure is positive and significant, which is consistent with the finding that demographic pressure increases the likelihood of civil conflict, holding all other variables constant. When these measures are interacted, however, the results are not as simple.

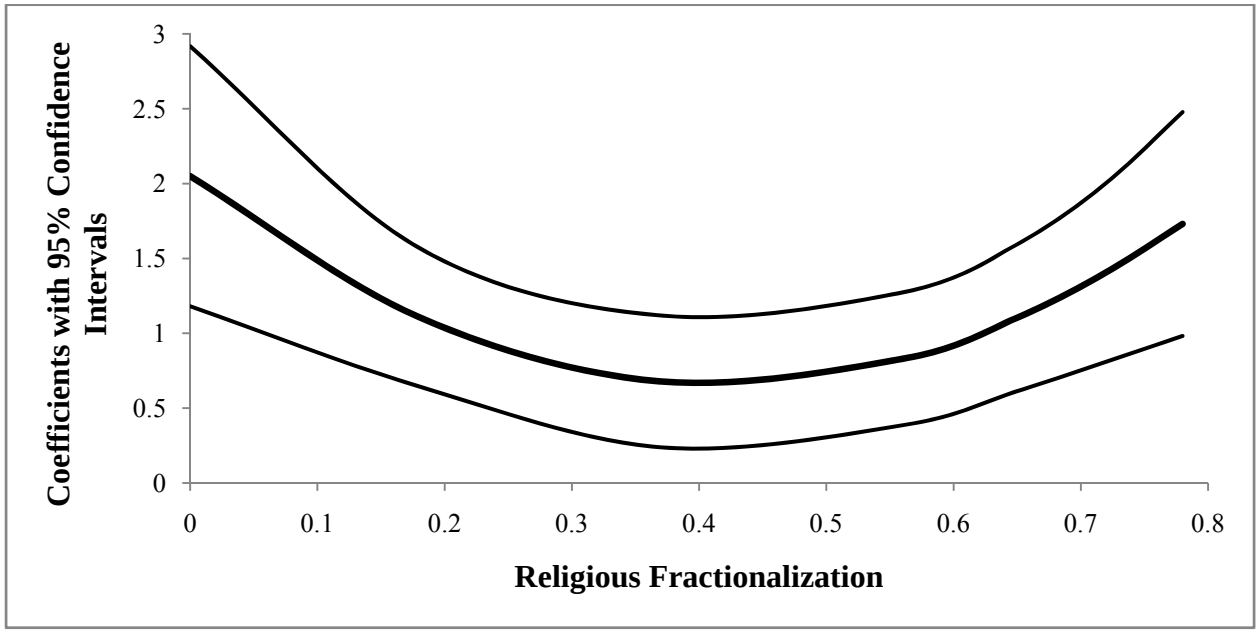

Figure 5.8. Impact of Demographic Pressure Conditioned on Religious Fractionalization

In Model 5.17, RF and its square are interacted with *demographic pressure*. *Demographic pressure* is positive and statistically significant, indicating that when RF is zero (religiously homogenous), the impact of demographic pressure is positive and distinguishable from zero. RF and its square are both statistically significant with RF positive and the square negative. This suggests that when demographic pressure is zero, the inverted-U shaped relationship between RF and civil conflict holds. Both interaction terms are statistically significant; however, the interaction between *demographic pressure* and RF is negative and the interaction with the square is positive, exactly the opposite of the hypothesized expectation.

These results indicate that as RF increases, the impact of demographic pressure *decreases* and then increases. Figure 5.8 illustrates this relationship. In this figure the 95% confidence intervals never include zero; therefore, the impact of demographic pressure is statistically significant for all values of RF. However, as is indicated by the graph, this impact decreases from the lowest level of RF to approximately 0.4 at which point it begins to increase.

Finally, Figure 5.9 presents the probability of civil conflict for different values of *demographic pressure* and RF. As *demographic pressure* increases, so does the probability of civil conflict generally; however, the shape of this relationship changes as demographic pressure increases. For example, at lower levels of demographic pressure, an inverted-U is created across the values of RF. This inverted-U steadily approaches a horizontal line as the value of *demographic pressure* increases, and when demographic pressure is at its 95th percentile, the relationship switches to a U-shaped one, indicating that increases in RF *decrease* the probability of civil conflict, until approximately 0.4 and then increase. Again, this is contrary to the hypothesis forwarded in this chapter (H4c) which would expect the inverted-U to hold across all levels of demographic pressure. However, as religious fractionalization is also an understudied phenomenon within the civil conflict literature, these results provide a counter-intuitive jumping off point for future studies not considered here.

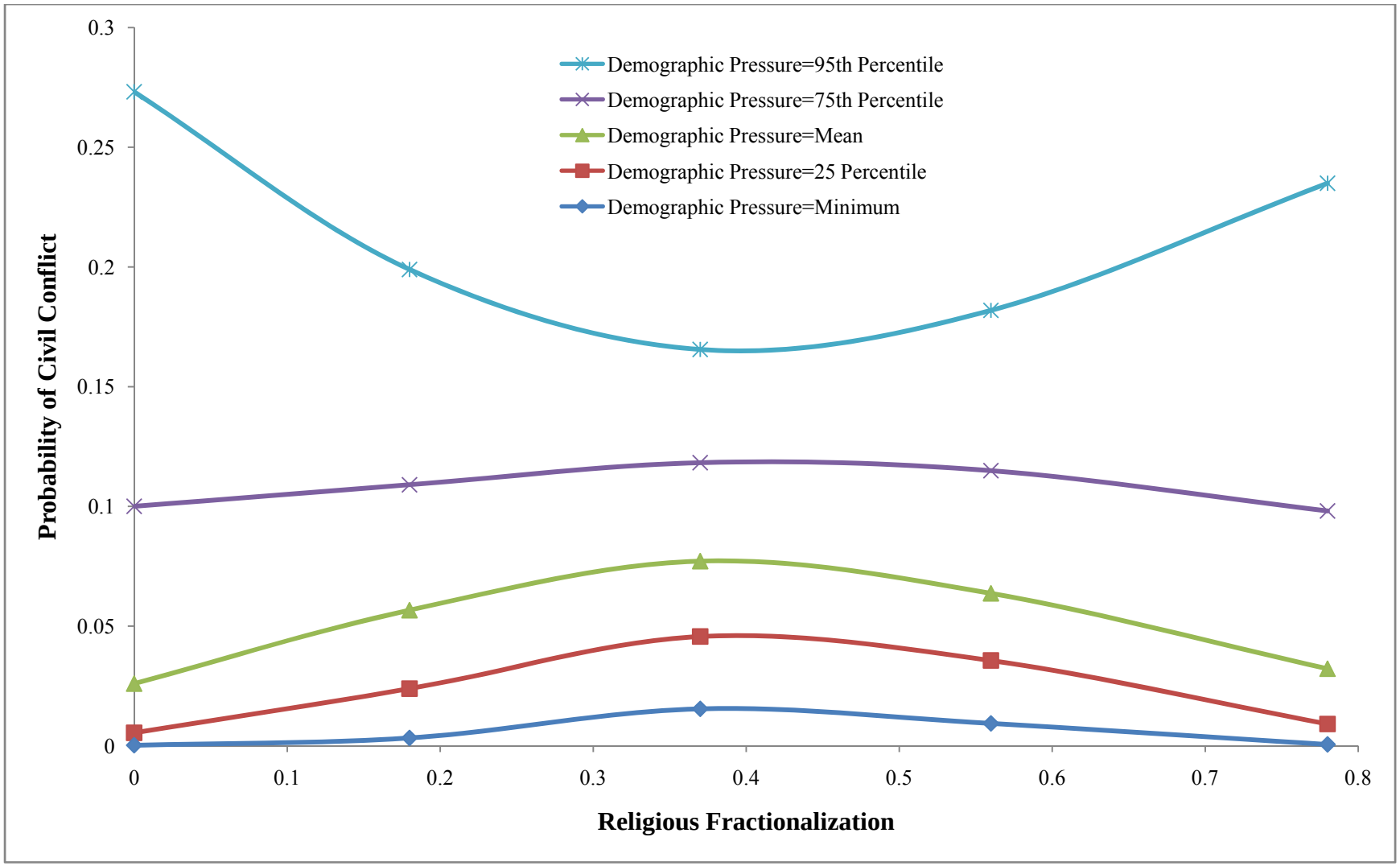

Figure 5.9. Probability of Civil Conflict at Various Levels of Religious Fractionalization and Demographic Pressure

5.4 DISCUSSION

This chapter has tested several hypotheses linking demographic pressure and the occurrence of civil conflict. The main unconditional hypothesis presented here was that demographic pressure is expected to increase the likelihood of civil conflict. Tested using three measures of demographic pressure, this hypothesis found consistent support even across different specifications of the dependent variable. Despite a high correlation among the individual 'pressure' factors, two, the youth to adult ratio and population density, were significant predictors of an increase in the likelihood of civil conflict. In an effort to reduce the multicollinearity in this model, an additive index of demographic pressure was created, capturing the number of 'pressure' factors in the country that are above average. Replacing the five 'pressure' factors with this index, the model showed that demographic pressure significantly increased the likelihood of civil conflict.

Finally, using factor analysis, I created a second composite measure of demographic pressure which extracted the commonalities from the five 'pressure' factors. It was this variable that I used for the remaining analysis, and like the index of demographic pressure, this measure significantly increased the likelihood of civil conflict. This result is not simply statistically significant, however. The changes in predicted probability as shown in Table 5.7 indicate that demographic pressure is substantively significant as well. Especially because civil conflict is a

relatively rare event (approximately 15% of cases in this sample), the changes in probabilities as a function of changes in demographic pressure are noteworthy.[102]

Having found support for the main civil conflict hypothesis, the rest of the tests in this chapter were conducted to specify the conditions under which demographic pressure had the greatest impact and when other characteristics of states would magnify or mitigate the impact of demographic pressure. Three different characteristics of states were assessed: wealth, level of democracy, and social cleavages.

5.4.1 Wealth

Throughout the analyses in this chapter, the consistent *positive* coefficient for the wealth variable has been confounding, as a state's GDP per capita is one of the most robust variables in the civil conflict literature as a *negative* predictor of civil conflict (increased wealth corresponds to a lower likelihood of civil conflict). There are two possible empirical explanations for this unexpected result. First, the sample utilized in this analysis is somewhat different than those used in many other studies. The demographic variables used in all the measures of demographic pressure were gleaned from the World Bank's World Development Indicators which begins its

[102] Some readers may be concerned that the different model specifications do not have noticeably different chi-squared or pseudo-R^2 statistics. This is not surprising for two reasons. First, the chi-squared statistic measures only whether the model as a whole provides a significantly different prediction than if all the independent variables were set at zero, i.e., guessing the modal category. Thus, if any of the independent variables are statistically significant, the chi-squared statistic is also expected to be significant. Additionally, likelihood ratio (LR) tests determine whether one model is statistically different than a nested model within it. When the difference between the two models is one variable (*demographic pressure* is the only variable added to the base model), if that variable is statistically significant, the LR test indicates that the two models are significantly different. Thus, the chi-squared statistic and its cousin, the LR test, cannot reliably speak to the substantive effect of a particular variable. Second, the R^2 statistic is a measure of linearity. Logit models, which are employed in this analysis, are not expected to produce a linear relationship between the independent variables and the dichotomous dependent variable. Thus, a measure of linearity (or linear variance explained) is also not a useful statistic to determine substantive impact. See Kennedy (2003) for further discussion of these tests.

time series in 1960. Most other studies of civil conflict assess the entire post-World War II era and begin in 1945 (see Fearon and Laitin 2003 as an example). The loss of approximately 15 years of data in which several civil conflicts (Korea, Greece) took place may affect the results. Additionally, the inclusion of the economic growth variable excluded a large number of developing countries in Africa, Asia, and Eastern Europe which may also contribute to this result.[103]

The second factor which may explain the unexpected wealth result is the high negative correlation between *demographic pressure* and *state wealth* as discussed in Chapter 4. This negative correlation is expected because each demographic factor is divided by state wealth to create the measures of demographic pressure. Multicollinearity, then, may be leading to the positive wealth result. This does not completely explain the result, however, because in Model 5.1 when *demographic pressure* is not present, *state wealth* is insignificant, not negative as expected.

One theoretical explanation for this result may be inclusion of lower-level conflicts in this analysis. The studies previously cited that found a negative relationship between wealth and civil conflict were studies of civil *war* onset.[104] It is reasonable to believe that wealthier countries may experience low-level violence that never escalates to a full-scale civil war. In fact, in this sample, the mean GDP per capita for those countries experiencing a civil war was approximately $450 less than the mean GDP per capita of those countries experiencing the broader phenomenon of civil conflict. While this does not represent a large difference between the two groups, it may help explain the positive coefficient on the *state wealth* variable. The

[103] Removal of the growth variable increased the sample size and the wealth variable remained positively signed but lost its statistical significance. The impact of demographic pressure remained consistent.
[104] A major paper that uses the same dependent variable as is used in this study (Miguel, Satyanath and Sergenti 2004) find an insignificant relationship between GDP per capita and civil conflict occurrence.

logic presented here is somewhat undermined by the results in Appendix B which suggest that *state wealth* is positively associated with civil war occurrence, but again, civil war *onset* models are those which most clearly draw the negative link between wealth and conflict. More investigation is needed to confirm more conclusively why the wealth result performs counter-intuitively in these models.

Given that the state wealth variable produces counter-intuitive results, it is possible that any refinement of the chapter's main hypothesis that includes wealth will also produce counter-intuitive results. H2 stated that relatively wealthy states would have a lower probability of civil conflict than states with less wealth, especially when experiencing demographic pressure. The impact of demographic pressure was found to be somewhat stable across all values of wealth (horizontal slope of the line in Figure 5.1). Therefore, H2 was not supported by this analysis.

5.4.2 Level of democracy

H3 presumed that autocracies and democracies would have a lower incidence of civil conflict than anocracies (those states with characteristics of both autocracies and democracies). Given this relationship, the impact of demographic pressure was expected to impact anocracies more strongly than the other two types of governments. Throughout the analyses, the curvilinear relationship between *level of democracy* and civil conflict held. When interacted with demographic pressure, however, the results were not as expected. Though *demographic pressure* was significantly associated with an increased likelihood of civil conflict in complete autocracies (see positive, significant coefficient of demographic pressure in Model 5.12), neither the level of democracy variable, nor the interaction terms were statistically significant. Also, as indicated in Figure 5.2 the impact of demographic pressure across the range of *level of*

democracy was *linear* instead of non-linear as hypothesized. Thus, H3 was not initially supported by the results. Figure 5.3, however, did indicate that at higher levels of *demographic pressure*, the probability of civil conflict was non-linearly related to the level of democracy in the expected way. Therefore, while this relationship did not manifest itself along all values of demographic pressure; it is important to observe that when demographic pressure is high, the country's regime type does become important in determining the probability of civil conflict.

5.4.3 Social cleavages

5.4.3.1 Ethnic fractionalization (EF)

Believing that *ethnic fractionalization* (EF) is non-linearly related to civil conflict, I included both EF and its square in my analysis. The results of the various models suggests that EF indeed exerts a significant non-linear impact on the likelihood of civil conflict, as indicated by the alternating signs on the main variable and its squared term, as well as the fact that both terms retained statistical significance across most models. H4a posited that demographic pressure should augment the problems associated with EF and increase the likelihood of civil conflict until a certain level of EF, at which point the impact of demographic pressure would decrease. As illustrated by Figures 5.4 and 5.5, this hypothesis did not hold.

It is possible that the relationship between EF, demographic pressure and civil conflict is even more complicated, however, than captured in Model 5.13. To model the non-linear relationship between fractionalization and civil conflict, a squared term was added to the model. However, a higher level polynomial, an ordinal classification, or a series of dummy variables may be more appropriate, given the results seen here. It is not clear at what level of diversity within a society pluralism becomes manifest. Table 5.11 reports the *demographic pressure*,

ethnic fractionalization, the *number of languages*, *religious fractionalization*, and the value of the dependent variable (civil conflict) in four countries in 1999: Japan, Rwanda, the United States, and India. Japan is an extremely homogeneous country with only a 1.2 percent chance that two randomly selected people in the country would be from different ethnic groups. Japan is also a society with very little, if any civil conflict. At the other extreme, in India, a country with a great deal of civil conflict, there is an 81% chance that two randomly selected people are from different ethnic groups. While at first, this might suggest a *linear* relationship between ethnic fractionalization and civil conflict, by looking at the other two states in the table, it is indicative of a more complicated picture.

Table 5.11. Social Cleavages in Japan, Rwanda, the United States and India in 1999

Country	***Demographic Pressure***	***Ethnic Fractionalization***	***Number of Languages***	***Religious Fractionalization***	***Civil Conflict***
Japan	3.13	0.01	1	0.26	No
Rwanda	6.73	0.18	1	0.51	Yes
United States	3.08	0.49	3	0.60	No
India	4.68	0.81	46	0.34	Yes

The United States, often viewed as a pluralistic country with little civil violence, has an *ethnic fractionalization* level of 49%, and Rwanda, a state with a very violent history of civil conflict has a level of 18%. Therefore, a linear relationship between *ethnic fractionalization* and civil conflict does not seem to hold. No firm conclusion can be drawn from so few cases; however, these examples may suggest a typology of ethnic fractionalization: homogenous (Japan), ethnically dominant (Rwanda), pluralistic (US), and highly fractionalized (India). Civil conflict may be more likely in ethnically dominant (where one group dominates another in political and/or economic matters) and highly fractionalized (where there are so many groups that contestation for resources is very high and consensus is difficult to achieve) societies while homogenous (where cleavages do not exist along identity lines due to lack of diversity) and

pluralistic (where there is a mix of groups but resources are not allocated along identity lines) societies are expected to be more peaceful. *Ethnic fractionalization* as presented here (with a variable and its square) may not capture this relationship accurately, which may account for the lack of empirical support for this social cleavage hypothesis.

5.4.3.2 Number of languages

The number of languages within a country was expected to increase the probability of civil conflict (which was confirmed by Model 5.14), and the impact of demographic pressure was expected to augment this relationship. H4b proposed that the impact of demographic pressure would increase as the number of languages within a country increased. Figure 5.6 indicates that this hypothesis, too, is not supported by the analysis. In this figure (as indicated by the negative coefficient on the interaction term in Model 5.15) the impact of demographic pressure *decreases* as the number of languages increases, the opposite result as the one hypothesized.

This decreasing impact may be seen more intuitively in Figure 5.7. Keeping in mind that 75% of countries have 12 or fewer languages spoken by 1% of the population or 1 million people, for all but the highest amount of *demographic pressure*, the probability of civil conflict increases (weakly) as the number of languages increases. For the maximum value of *demographic pressure*, however, the probability of conflict *decreases* as *number of languages* increase. As *demographic pressure* increases, however, the slope of each line becomes increasingly flat (again, excluding the maximum value). Thus, for example, when *demographic pressure* is at the 95th percentile, the probability of civil conflict does not noticeably change across the value of *number of languages*.

5.4.3.3 Religious fractionalization (RF)

The expectations of the religious fractionalization (RF) variable were very similar to those of the EF variable: a non-linear relationship between RF and civil conflict, and a non-linear impact of demographic pressure, conditioned on RF. A non-linear impact of demographic pressure, conditioned on RF was found; however, it did not support H4c. As indicated in Figure 5.8 the impact of demographic pressure decreases until approximately 0.4 and then increases, exactly the opposite as predicted. Figure 5.9, which greatly resembles Figure 5.5 (predicted probabilities of conflict across the level of EF), illustrates the expected relationship at lower levels of demographic pressure but not at higher levels. Perhaps the categorizations suggested for varying amounts of ethnic fractionalization would be useful for religious fractionalization as well: homogeneity, religious dominance, pluralism, and highly fractionalized. It is not clear that a misspecification of the model is the culprit for the lack of results found for this social cleavage variable; however, any tests to determine this must wait for future analysis.

5.5 CONCLUSION

Table 5.1 at the beginning of the chapter summarized the expectations of each of the hypotheses to be tested in this chapter. This table was recreated as Table 5.12 to report whether each of the hypotheses was supported by the empirical results. While only H1, the unconditional demographic pressure hypothesis was consistently, significantly supported by the analysis, the results presented in this chapter have added to our knowledge of the relationship between demographic pressure and civil conflict occurrence, and they have provided a very interesting set of results which should provide a stable jumping off point for future analysis. Many of the

'unsupported' results did receive limited confirmation at some values of the variables of interest; however, this limited support was not sufficient to claim that the hypotheses as presented were supported. Because there is little empirical research specifying the conditions under which demographic pressure is expected to affect the likelihood of civil conflict, the analyses presented here, despite their disappointing conclusions, are a first cut at explaining many of these relationships. As unsatisfying as it is to fail to explain counter-intuitive findings, such results will provide ample opportunities to specify more clearly the expected relationships and generate a series of projects with potential to augment current literature.

Table 5.12. Intra-state Hypotheses, Empirical Expectations, and Support for Expectations

Hypothesis	*Variable of Interest*	*Empirical Expectation*	*Result*
H1	*Demographic Pressure*	+	Supported
H2	*Demographic Pressure * State Wealth*	-	Unsupported
H3	*Demographic Pressure * Level of Democracy*	+/-	Limited
H4a	*Demographic Pressure * Ethnic Fractionalization*	+/-	Unsupported
H4b	*Demographic Pressure * Number of Languages*	+	Unsupported
H4c	*Demographic Pressure * Religious Fractionalization*	+/-	Unsupported

This chapter has presented the results of hypotheses linking demographic pressure to civil conflict. The next chapter (Chapter 6) will test the link between demographic pressure and inter-state conflict.

6.0 FOR THE PEOPLE? DEMOGRAPHIC PRESSURE AND INTER-STATE DISPUTE INITIATION

While the previous chapter tested the link between demographic pressure and civil conflict, this chapter tests several hypotheses forwarded in Chapter 3 concerning the relationship between demographic pressure and inter-state conflict. Section 6.1 re-introduces the hypotheses to be tested in the chapter. Section 6.2 outlines the research design, including the model to be tested and the variables employed. Section 6.3 presents the results of the statistical tests, and Section 6.4 discusses these results. In Section 6.5 I directly test the links among demographic pressure, inter-state conflict, and civil conflict, and Section 6.6 concludes the chapter.

6.1 INTER-STATE CONFLICT HYPOTHESES

In Chapter 3 I outlined the political relationship between the state and its people and detailed how demographic pressure may contribute to a breakdown of this relationship. To summarize, demographic pressure occurs when the demographic profile of the state, including the population growth rate, the proportion of young adults to the total adult population, population density, level of urbanization, and amount of refugees residing in the country, strains the government's ability to provide goods and services to the population. Failure of the government to provide needed goods and services leads to grievances among societal groups who may look to replace the

government or secede from the state if their demands are not met. Governments, then, have an incentive to provide the needed goods and services to prevent attempts by societal groups to replace them. This can be problematic for governments, however, because demographic pressure may inhibit the people's ability to transfer rents to the government, rents which are needed to provide the public goods and services demanded by the people.

If a government cannot extract resources internally, they may need to look externally for the resources it needs. Resources may be acquired peacefully via trade or international borrowing, or governments can form alliances and reallocate the resources not used on defense toward domestic spending. These options are not always available to states, however, and states may need to pursue external military action to address their internal problems. Seizure of territory or easily lootable resources may be used to pacify the domestic population, or military conflict could be used to force rival states to make concessions that allow the pressured state access to resources. Military conflict may also be employed to control population flows across the border, as was the case when El Salvador invaded Honduras in 1969 to prevent the flow of former Salvadoran émigrés back across the border.[105]

Therefore, to avoid the domestic challenges that might result from a potential breakdown, governments may attempt to acquire needed resources from other states using a variety of means. This proposition led to four hypotheses linking demographic pressure to inter-state military conflict. First, demographic pressure, a pattern of unsustainable demographic change, is expected to increase a state's likelihood of violent inter-state conflict as states extend militarily outside their borders to acquire needed resources.

> H5: States experiencing demographic pressure are more likely to initiate inter-state military conflict than are states not experiencing demographic pressure.

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[105] See Durham (1979).

Demographic pressure may not affect all states in the same way. Certain attributes of states may condition the impact of demographic pressure by making internal and external options more or less attractive than military conflict. Therefore, a series of conditional hypotheses were articulated in order to determine the conditions under which military conflict is likely to be the strategy pursued.

Violent inter-state disputes are not the only external means that states have to acquire resources in the face of demographic pressure. Another external option includes borrowing money to finance domestic programs is also an alternative. As discussed in Chapter 3, while wealthy states have better access to international financing to alleviate the problems created by demographic pressure, they are the states that are least likely to experience demographic pressure due to their national wealth and greater ability to adapt to the demographic shifts.[106] However, if demographic pressure becomes a severe problem in wealthy states, such states are most able to afford a military campaign. Therefore, I forward the following hypothesis:

> H6: Wealthy states are more likely to initiate an inter-state military conflict when faced with demographic pressure than are less wealthy states.

Second, for states which are highly dependent on their trading partners, militarized conflict may disrupt this important trade link, and therefore, such states have a disincentive to initiate a violent inter-state dispute against their important trading partners. Even when a state is experiencing demographic pressure, this relationship is expect to hold, as such states would not wish to harm an avenue through which they might be able to alleviate their economic stress.

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[106] Additionally, wealthy states tend to have the opposite demographic problem from poor states. In many wealthy states, population is expected to decline in coming decades, therefore, the demographic pressure they experience is very different than the demographic pressure in poor countries, and it is also less likely to lead to conflict, as scarcity of goods and services is less of a problem. See Chapter 4 for a more detailed discussion of ways to measure demographic pressure.

However, when faced with demographic pressure, states inclined to military action might target states upon which they are less dependent. This logic leads to the following hypothesis:

H7: The impact of demographic pressure should decrease as trade dependence increases.

External options are not the only ones available to states when they are faced with demographic pressure and possible domestic unrest as a result, however. An internal option exists as well. If dissent and protests can be quelled by the government, the fear of government overthrow diminishes. However, only very autocratic states have the tools and the ability to wield them effectively that will enable them to escape the threat of state breakdown. Autocracies have little incentive to treat the domestic population gently. They are not accountable to voters, and as long as they keep certain small groups contented, the needs of people are easily ignored (Bueno de Mesquita et al. 2005). Democracies, on the other hand, tend not to repress, as they are governments that face popular votes at regular intervals. Because they are held accountable by the voters of the state, democracies do not have a viable option to oppress internally and may act externally as a result.[107] However, because of the institutional constraints placed on democratic governments, it is much more difficult to engage in external violence than other types of regimes (Morgan and Campbell 1991). Thus, while democratic norms may prevent democratic governments from repressing internal dissent, institutional constraints are expected to prevent governments from initiating conflicts externally.

Anocracies, however, those states that possess features of both democratic and autocratic regimes are not constrained in the same ways as democracies are due to incomplete institutional

[107] Democracies can act against groups of non-citizens, typically through expulsion of immigrants or refugees. Though this may prove to be a popular strategy, it can also backfire on the government and lead the voting population to protest such policies (See Martin Arnold, "French crackdown on migrants sparks revolt," *Financial Times* (US edition), 17 June 2006 and Martin Arnold, "Child deportations stir French disobedience; Expulsion of illegal immigrants wins popular support but not when it comes to schoolchildren," *Financial Times* (London edition), 10 July 2006.).

consolidation (Mansfield and Snyder 2002; 1995), yet their repressive capabilities are not as effective as are those in autocracies because the semi-openness of their political system means that they would have to repress a large segment of the population for their regime to remain safe (Bueno de Mequita et al. 2005). Thus, because internal repression would be unwieldy and there are few constraints on external action, anocracies are more likely to pursue an external military option than other regime types.

The links between regime type and ability to repress internally lead to the following hypothesis regarding regime type and inter-state conflict initiation given demographic pressure.

> H8: When experiencing demographic pressure, anocracies are more likely to initiate violent inter-state conflict than other types of political systems.

Having briefly reviewed the hypotheses that will be tested in this chapter, the next section details the research design for these tests.

6.2 RESEARCH DESIGN[108]

The hypotheses forwarded suggest that certain characteristics of states are vital in determining that state's opportunity and ability to initiate an inter-state dispute. Also, important, however, are the characteristics of a state's potential target and how similar the two states are. Therefore, to test my hypotheses, I compiled a sample of politically-relevant, directed-dyads. Politically-relevant dyads are comprised of contiguous states (defined below) and those dyads containing a

[108] Much of the data set utilized to test my hypotheses was generated by EUGene, an expected utility generation and data management program created by Bennett and Stam (2000). EUGene combines data from a variety of sources to ease the researcher's task of compiling credible data sets. Though EUGene provided the location for much of the data, the original researchers continue to deserve the credit for their work. Additionally, there have been many updates to the data since EUGene's launch. Therefore, for the remainder of this study, the original citation for the data will be provided.

major power: United States, United Kingdom, France, China or Russia throughout the period under consideration, or Germany and Japan from 1991 onward (Correlates of War Project 2005b). States are typically unable to assert their military power beyond a certain geographic distance unless they are a major power; thus, by using only politically-relevant dyads, I am able to control for opportunity to engage in conflict.[109] Dyads are considered because states contemplating military action have to decide which state to attack (if any), and the dyadic framework enables the researcher to account for characteristics of both the challenger and target, as well as relational characteristics between the two states. Directed-dyads are the appropriate unit of analysis because the theory presented in Chapter 3 indicates that states have incentives to initiate conflict against other states. A directed-dyad approach allows for each member of the dyad to be the initiator (State *i*), or challenger, (State *j*), and provides a better test of conflict initiation than the prominent non-directed dyad approach popularized by Oneal and Russett (1997; 1999).[110] My sample is, therefore, restricted to politically-relevant directed-dyads from 1961-1999.[111]

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[109] In fact, Clark and Nordstrom (2003) argue that using an all-dyad approach instead of only politically-relevant dyads may lead to poor statistical inference due to unobserved treatment effects. They suggest that the politically-relevant dyad approach provides more accurate results. Lemke and Reed (2001) argue that the use of politically relevant dyads may introduce systematic measurement error and selection bias by including 'relevant' dyads with no opportunity to fight and excluding 'irrelevant' dyads that do. However, they also admit that only two of the 34 'irrelevant' wars were initiated (my main action of interest) and in the rest of the wars, 'irrelevant' countries were joiners. While I do not wish to dismiss the concern of losing observations and introducing bias into my analysis, I also wish to reduce my sample due to the infrequent observations of violent conflict initiations. Additionally, Lemke and Reed (2001) acknowledge that the use of politically relevant dyads does not substantively affect the estimates of the primary relationships in conflict studies. Therefore, I employ politically relevant dyads rather than all possible dyads in this analysis.

[110] With a directed-dyad approach, there may be a concern about the independence of observations. While the same dyadic members are accounted for twice in a given year, many of the (state-specific) variables, as well as the dependent variable, are different. Without including both observations for a dyad in each year, I would not be able to assess each state's probability for initiation of an inter-state dispute.

[111] Some may argue that these are not independent observations because of temporal dependence. As in Chapter 5, to control for this, I follow the wisdom of Beck, Katz, and Tucker (1998) and utilize Tucker's (1999) program to estimate a natural cubic spline function to account for any temporal dependence induced by the number of years of peace experienced since the last dispute. These splines are calculated and included in each model; however, they are not reported in the final results.

I will utilize a logistic regression to estimate Equation 1 in order to test the first hypothesis.

(6.1) $\Pr(\textit{Violent inter-state initiation}_i) = \beta_0 + \beta_1 * \textit{Demographic Pressure}_i + \beta_x * \textit{Control Variables}$

H6, H7, and H8 are all conditional hypotheses, i.e., the impact of demographic pressure on violent interstate dispute initiation is determined by the value of another variable. Therefore, for each hypothesis, an interaction term between *demographic pressure* and the variable of interest for that hypothesis must be added to the model. Equation 6.2 presents the model for H6, with each subsequent hypothesis altering the composition of the interaction term.

(6.2) $\Pr(\textit{Violent inter-state initiation}_i) = \beta_0 + \beta_1 * \textit{Demographic Pressure}_i + \beta_2 * \textit{State Wealth}_{i,t-1} + \beta_3 * (\textit{Demographic Pressure}_i * \textit{State Wealth}_{i,t-1}) + \beta_x * \textit{Control Variables}$

H8 is slightly different than the other hypotheses because it predicts a non-linear relationship between *level of democracy* and inter-state conflict, which is exacerbated by demographic pressure. To test this more complicated relationship, not only will *level of democracy* be interacted with *demographic pressure*, but *level of democracy* itself with be squared and the squared term will be interacted with *demographic pressure*. The model to be tested for this hypothesis is found in Equation 6.3.

(6.3) $\Pr(\textit{Violent inter-state initiation}_i) = \beta_0 + \beta_1 * \textit{Demographic Pressure}_i + \beta_2 * \textit{Level of Democracy}_i + \beta_3 * \textit{Level of Democracy}_i^2 + \beta_4 * (\textit{Demographic Pressure}_i * \textit{Level of Democracy}_i) + \beta_5 * (\textit{Demographic Pressure}_i * \textit{Level of Democracy}_i^2) + \beta_x * \textit{Control Variables}$

Table 6.1 summarizes the hypotheses test in this chapter, including the variables of interest, as well as the expectation regarding the direction of the impact. A positive sign translates into an expectation that the variable will be associated with an increase in the likelihood of inter-state initiation, while a negative sign implied a decrease in the likelihood of conflict initiation. *Level of Democracy* is expected to have a non-linear relationship with conflict

initiation, indicated by both a positive and then negative expectation. The expectations in this table will be revisited at the end of the chapter to assess whether the hypotheses were supported by the empirical evidence.

Table 6.1. Inter-state Hypotheses and Empirical Expectations

Hypothesis	*Variable of Interest*	*Empirical Expectation*
H5	*Demographic Pressure*	+
H7	*Demographic Pressure * State Wealth*	+
H8	*Demographic Pressure * Trade Dependence*	-
H9	*Demographic Pressure * Level of Democracy*	+/-

6.2.1 Dependent variable

The dependent variable in this model, *violent inter-state initiation*, is a dichotomous measure of the initiation of a violent militarized inter-state dispute in the year of the observation. A violent initiation is defined as an initiation that entails either a use of force or a war, as defined by the Correlates of War (COW) project (Jones, Bremer, and Singer 1996). It is coded "1" if the first state in the dyad (State *i*/the challenger) initiated a violent dispute against the second state (State *j*/target) in that year and "0" otherwise.[112] I exclude non-violent disputes such as threats or displays of force, as my theory specifies that states will engage in large-scale violence in order to acquire needed resources, requiring violent action such as blockades, occupation of territory, seizures of land, attacks, and wars. As a robustness check to ensure that the results of this chapter are not a function solely of the specification of the dependent variable, Appendix C presents the results of a test for H5 using two alternate specifications of the dependent variable: *All MID initiations* and *war initiation*.

[112] Remember, for each dyad in the directed-dyad framework, both states are 'State *i*' and 'State *j*' in different observations.

6.2.2 Explanatory variables

6.2.2.1 Demographic pressure

This is the same variable which was discussed in Chapter 4 and utilized in Chapter 5. The summary of this variable that was provided in Chapter 5 is re-created here to remind the reader about its construction.

A first set of measures assessed are the individual demographic components mentioned in Chapter 3: population growth, age stratification (measured as the ratio of 15-24 year olds to the total adult population (15-65)), population density, urbanization, and refugees, all divided by the wealth of the state, measured in logged gross domestic product (GDP) per capita. Each component was divided by logged GDP per capita to capture the fact that not all states can adapt to their demographic profile in the same way. Population growth of 3% may overwhelm the resources of a poor state, while a wealthier state may accommodate such growth without a negative effect. There is a moderate level of correlation among these variables, however, so including all five of them in a model induces a great deal of multicollinearity, which may obscure the impact of these variables on the likelihood of civil conflict. Additionally, including separate 'pressure' components fails to account how each factor may combine with the impacts of the others, and it does not provide a parsimonious measure of the concept of demographic pressure.[113]

In an attempt to address some of these limitations, I next created an additive index of demographic pressure. To create this single measure, I dichotomized each 'pressure' component, making it equal "1" if the 'pressure' component was greater than the mean of the

[113] I do include models with these variables in them for completeness purposes, despite my belief that they are not the most theoretically persuasive measurements of the concept of demographic pressure.

sample, and "0" otherwise. Once all five 'pressure' components had been dichotomized, I added the five dummy variables together, creating an index ranging from 0-5, with 0 indicating that the state had no weighted component over the sample mean and 5 indicating that the state was above the mean on all five 'pressure' components. Given that states are potential initiators in many directed dyads per year, depending on their major power status and number of neighbors, the distribution of this variable is different than in the country-year analysis in the previous chapter. For this reason, Table 6.2 presents the tabulation of the index of demographic pressure within the sample utilized in this chapter. As in Chapter 5, the index has a relatively normal distribution which skews to the right, i.e., there are more observations with three or more above average 'pressure' measures than observations with two or fewer.

Table 6.2. Tabulation of Demographic Pressure (Index)

Category	Frequency	Percentage
0	351	0.45
1	6,656	8.55
2	23,631	30.37
3	37,197	47.81
4	8,398	10.79
5	1,571	2.02
Total	77,804	100.00

This measure is not without fault, however. First, it is very sample-specific because the criteria for dichotomizing each 'pressure' component is whether the value of the variable is above or below the sample mean. Additionally, adding the dichotomous codings together may not precisely capture the concept of demographic pressure. An additive scale implies that the more of the components a state has, the worse the demographic pressure is. While this makes logical sense, it also obscures the scenario where a state experiences one factor severely but none

of the others. This state would have 'less' demographic pressure than a state with slightly more than average values in two categories.

Table 6.3. Tabulation of Demographic Pressure (Factor)

Category	Frequency	Percentage
[min, 25th percentile]	32,935	42.33
(25th percentile, mean]	11,898	15.29
(mean, 75th percentile]	18,585	23.89
(75th percentile, max]	14,386	18.49
Total	77,804	100.00

These limitations led me to use factor analysis to create a measure of demographic pressure. Factor analysis is a technique used by social scientists to extract from a collection of variables the commonalities among them. I was able to draw one factor score from the five 'pressure' components, which I called *demographic pressure*. I rescaled this measure so that the minimum value of the sample equaled "0". The maximum value of this variable is 6.89. It is this measure that I use for the bulk of the analysis in this chapter. Table 6.3 presents a tabulation of the demographic pressure variable created using factor analysis, with observations grouped into four mutually exclusive categories: [min, 25th percentile], (25th percentile, mean],(mean, 75th percentile], and (75th percentile, max]. As with the index of demographic pressure presented in Table 6.2, the frequency of this variable is different than that reported in Table 5.2 because of the sample utilized in this chapter. Because there are many more observations for each Great Power than for minor powers, the distribution of this variable is very different than in Chapter 5. Great Powers tend to be wealthier than minor powers which would reduce the likelihood of experiencing demographic pressure. This is supported by the fact that over 42% of observations have demographic pressure in the lowest category. However, assessing Table 6.4, there are disproportionately more conflict initiations among states with higher levels of demographic

pressure than fall into the lower categories. These simple descriptive statistics suggest that demographic pressure may play an important role in explaining conflict initiation.

Table 6.4. Tabulation of Demographic Pressure (Factor) when Violent Initiation = 1

Category	Frequency	Percentage
[min, 25th percentile]	87	21.48
(25th percentile, mean]	80	19.75
(mean, 75th percentile]	158	30.01
(75th percentile, max]	80	19.75
Total	405	100.00

6.2.2.2 State wealth$_{i,t-1}$

This variable is operationalized as the natural log of the gross domestic product per capita (in 1996 US dollars) of a state. The natural log is employed for two reasons: (1) because the marginal impact of a one dollar increase in GDP per capita for wealthy countries is much less than the same increase in GDP per capita for a poor country; and (2) due to the large variance of this variable, considering the wide disparity among the states in the sample. The data are derived from Gleditsch (2002). This variable is lagged one year to remain temporally prior to the dependent variable and reduce possible endogeneity concerns.

6.2.2.3 Trade dependence$_{ij,t-1}$

Adapting Oneal and Russett's (1997) calculation of trade dependence for this model, the trade dependence of State *i* on State *j* is derived with the following combination of exports (X) from the State *i* to State *j*, imports (M) to State *i* from State *j*, and gross domestic product (GDP) of State *i*:

$$TradeDependence_{ij} = \frac{X_{ij} + M_{ij}}{GDP_i}$$

This measure is lagged one year to avoid endogeneity concerns.[114] Gleditsch (2002) provides an update to Oneal and Russett's (1997) data.

6.2.2.4 Total trade$_{i,t-1}$

This variable measures the total amount of trade (exports plus imports) in which *State i* engages, divided by its gross domestic product (GDP). This measure is lagged one year to avoid endogeneity concerns that conflict in year *t* might affect trade in that year. Gleditsch (2002) is also the source for these data.

6.2.2.5 Economic growth$_i$

While state wealth is taken into account when determining the impact of demographic pressure, it is also necessary to control separately for the health of the domestic economy. Small states can experience robust growth while large states experience stagnant growth and vice versa. Therefore, I control for the economic health of the challenger state (State *i*) by including its growth in GDP per capita. The indicator employed is the average change in GDP per capita over a three year period (or fewer if data are missing). McDonald (2004), served as the source for these data.

6.2.2.6 Civil conflict$_j$

Starr (1994: 497) claims that "internal collective violence or revolution may be key factors in the differential growth of power, under different conditions drastically reducing or

[114] If trade is measured in the same year as the conflict, it is possible that the conflict could be affecting trade levels, leading to an endogeneity problem between the independent and dependent variables. Thus, these variables are lagged one year to avoid this problem; trade dependence and total trade are measured in the year preceding possible conflict, and therefore, they occur temporally prior to any conflict behavior that may be observed.

increasing the power of states." Forman (1972) suggests that civil war makes a state more attractive target to other states. Such states are often vulnerable to outside attack for two reasons. First, their attention is usually directed at internal threats, and it may prove difficult to mobilize against an external threat. Second, internal conflict often results in an outflow of refugees. Such refugee flows are expected to increase pressure on the governments of receiving states, increasing the likelihood that the receiving state (State *i*) will intervene in the state in crisis (State *j*) to alleviate refugee pressures.[115] This variable is based on data from Sarkees (2000). It is a dichotomous variable, coded "1" if there is an internal conflict in State *j*, and "0" otherwise.

6.2.2.7 Relative capabilities$_{ij}$

Using data from the COW project (Singer, Bremer and Stuckey 1972), this variable captures the capability symmetry or asymmetry between the states in the dyad. The Correlates of War Project (2005a) details, "Annual values for the computed Composite Index of National Capability (CINC) score are included with this data set. This measure is generally computed by summing all observations on each of the 6 capability components for a given year, converting each state's absolute component to a share of the international system, and then averaging across the 6 components." The six components include total population, urban population, iron and steel production, energy consumption, military personnel, and military expenditure. Two population measures are utilized to create this index; however, the method of transforming these (and the other four measures) into a composite index of capabilities as a share of the international system creates a measure that no longer resembles the original population measure.

[115] The refugee variable used in the measure of demographic pressure does not take into account from where the refugees residing in a country came. By including this variable, I can attempt to account for the motivation of a state to attack the state from which refugees may have fled.

Following Leeds (2003), the variable is calculated as a ratio, a continuous measure determined by dividing the capability score of the challenger by the total capability score of the dyad:

$$\mathrm{Re}\,lativeCapability_{ij} = \frac{Capability_i}{Capability_i + Capability_j}$$

Values above 0.5 indicate that State *i* has a greater preponderance of capabilities in the dyad while values below 0.5 indicate that State *i* possesses fewer capabilities than State *j*. Capability parity is represented by values of 0.5.

6.2.2.8 Contiguity

The opportunity for conflict is controlled for by measuring the extent of contiguity between the two states in the dyad. This measure is also used to define the selection of cases because it is critical in determining the definition of 'politically relevant'. Contiguity is defined as direct or indirect (through colonies) contact by land, or contact within 150 miles by sea. States that are in relatively close contact with each other geographically have a greater opportunity for conflict than states geographically distant from each other. Minor powers are not expected to be able to project their military capabilities over long distances, and will therefore limit any external military conflict to states within a close proximity to them.

6.2.2.9 Affinity

The level of shared interests between two states is often considered a major explanation for state behavior in an anarchic system. States with shared interests, *ceteris paribus*, are less likely to engage in inter-state disputes than are states with a large degree of interest dissimilarity. Gartzke's (2000) measure of affinity is used to capture the extent of shared interests in a dyad.

Calculated from yearly UN General Assembly votes,[116] this variable is a continuous measure between -1 and 1, with a score of -1 representing complete interest dissimilarity and a score of 1 signifying complete interest harmony.

6.2.2.10 Joint alliance

This variable is often included in conflict models to account for common dyadic interests; however, alliances are also international institutions, and this variable is expected to pick up the effects of institutional constraints on conflict. This variable is dichotomous, coded "1" if the members of the dyad are allied with each other and "0" otherwise. The ATOP (Alliance Treaty Obligations and Provisions) data project (Leeds et al. 2002) provided these data.

6.2.2.11 Regime dummies

Because the 'democratic peace' is a well-established research program, it is customary to control for the regime characteristics of the dyad. While non-directed dyadic models of conflict employ a simple 'joint democracy' variable to control for the general finding that pairs of democracies are less prone to conflict than are other types of dyads, in a directed-dyad approach, it is necessary to determine what type of state is initiating the conflict and what type of state is the target of such initiation. While authors including Oneal and Russett (1997) have found that democracies do not fight wars with each other, it is less clear whether democracies are more or less likely to initiate conflicts against non-democracies, or vice versa,[117] and there is some emerging evidence to support the notion that pairs of autocracies are less likely to fight each

[116] Gartzke has two measures of affinity. The one employed here includes a voting scale in which states either voted "yes" or "no" on each item before it in the UN General Assembly. The other measure uses a different coding, such that each state voted "yes," "no," or was present for voting, but abstained from the actual vote. As these measures are correlated at .91, both measures capture approximately the same (dis)similarity of interests.
[117] Morgan and Campbell (1991) do suggest that in general, democracies are more peaceful than autocracies.

other than mixed dyads (Bennett 2006). To control for the different combinations of regime types within the directed-dyad, I employ a series of dummy variables created from the Polity IV data set (Polity IV Project). *Joint Democracy* is coded "1" for directed-dyads in which both states in the dyad have Polity IV scores of 16 or greater, and "0" otherwise.[118] *Democracy-Non-democracy* is coded "1" for directed-dyads in which State *i* has a Polity score of 16 or greater, but State *j* has a Polity score less than 16, and "0" otherwise. *Non-democracy-Democracy* is coded "1" for directed-dyads in which State *j* has a Polity score of 16 or greater, but State *i* has a Polity score less than 16, and "0" otherwise". Finally, *Joint Non-Democracy* is coded "1" for directed-dyads in which both states in the dyad have Polity scores less than 16, and "0" otherwise. These four dummy variables are exhaustive and mutually exclusive, so only three of the dummy variables at a time are included in the model to avoid perfect multicollinearity.[119]

6.2.2.12 Level of democracy$_i$

This variable, drawn from the Polity IV data set (Polity IV Project), captures the regime type of the country. Originally, it ranged from -10 (completely autocratic) to 10 (completely democratic). Because the relationship between level of democracy and inter-state conflict is expected to be non-linear, however, the square of this variable must also be included in the models to be tested. Without rescaling the variable, the impact of level of democracy would be

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[118] Polity IV scores have been re-coded so as to range from 0 (most autocratic) to 20 (most democratic).

[119] Careful readers may notice that my hypothesis regarding *level of democracy* discusses anocracies, or mixed regimes, but my regime dummy variables do not reflect the existence of such regimes. The lack of their presence among the dummy variables is an attempt at parsimony; including anocracies would have resulted in the creation of nine separate dummy variables and the inclusion of eight in each analysis. If my concern in this project was the impact of regime type on conflict, I would have engaged in this process as there are plenty of degrees of freedom in the model. However, I chose to model joint regime in the manner outlined, and I will use the ordered *level of democracy* variable to test H8 rather than the regime dummies. Additionally, though Bueno de Mesquita et al. (2005: 243-244) discuss mixed regimes as different from other regimes, in their discussion of different conflict scenarios, they lump autocracies and anocracies together.

assumed to be symmetric (-10*-10 = 10*10). In order to avoid this assumption of symmetry, I added 10 to this variable, creating a new variable which ranges from 0-20 and squared it, to create a second variable which ranges from 0-400.

6.2.2.13 Time since last conflict

This variable is a count of the number of years since the last inter-state initiation by State *i*. It is this variable that is used to create the cubic splines, and together these variables attempt to control for any temporal dependence among observations. In its own right, the longer that has elapsed since the last initiation the less likely a new inter-state initiation is expected to be.

Before assessing the results of the tests of H5-H8, I present the descriptive statistics of the variables used in this chapter. The number of observations corresponds to the modesl using the composite measures of demographic pressure.

Table 6.5. Inter-state Descriptive Statistics

Variable[120]	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Violent Inter-state Initiation	52327	0.01	0.088	0	1
Population Growth$_i$	52327	0.19	0.17	-1.64	1.85
Youth to Adult Ratio$_i$	52327	3.28	1.28	1.35	6.35
Population Density$_i$	52327	0.46	0.16	-0.0002	0.98
Urbanization$_i$	52327	5.96	2.33	0.35	12.33
Refugees$_i$	52327	0.86	0.64	0	2.48
Demographic Pressure (Index)$_i$	52327	2.69	0.87	0	5
Demographic Pressure (Factor Score)$_i$[121]	52327	4.14	0.95	1.68	6.89
Affinity	52327	0.74	0.30	-0.39	1
Contiguity	52327	0.35	0.48	0	1
Joint Alliance	52327	0.31	0.46	0	1
Joint Democracy	52327	0.25	0.44	0	1
Joint Non-democracy	52327	0.27	0.44	0	1
Democracy-Non-democracy	52327	0.27	0.45	0	1
Civil Conflict$_j$	52327	0.19	0.39	0	1
Relative Capabilities$_{ij}$	52327	0.54	0.41	0	1.00
Trade Dependence$_{ij, t-1}$	52327	0.01	0.03	0	0.57
Total Trade$_{t-1}$	52327	0.23	0.20	0.003	2.96
Economic Growth$_i$	52327	1.97	3.83	-28.63	43.23
Time Since Last Conflict	52327	18.01	11.42	0	39
State Wealth (logged)$_{t-1}$	52327	8.54	1.16	5.74	10.34
Level of Democracy	52327	12.63	7.61	0	20
Level of Democracy^2	52327	217.48	170.35	0	400

[120] As in the civil conflict chapter, the five demographic components (population growth, youth to adult ratio, population density, urbanization, and refugees) are all weighted (divided) by the natural log of GDP per capita. In addition, population density was logged before being weighted by GDP per capita. Therefore, it is not possible to back out meaningful values of these variables from these descriptive statistics.

[121] This measure was created with the full sample of cases and rescaled with 0 as the smallest value of this variable. This case, Kuwait 1992, was not included in the analyses in this chapter due to missing values on other independent variables. For this reason, there is not a case in the sample with demographic pressure equal to zero, though that score was empirically possible.

6.3 RESULTS

Before testing the four hypotheses linking demographic pressure and inter-state military conflict initiation, I present a base model, including all the explanatory variables except *demographic pressure* and *level of democracy* (which is only used to test H8). The results of this test are found in Model 6.1 in Table 6.6. From this model, we can see that *contiguity, relative capabilities,* and *civil conflict in the target* increase the likelihood of the challenger initiating a violent inter-state dispute while *Affinity*, *total trade, economic growth*, and *time since the last initiation* reduce the likelihood of violent conflict. *Joint alliance*, *trade dependence*, and *state wealth* have no significant impact on the likelihood of conflict. The negative coefficients and statistical significance of the regime dummies suggest that a non-democracy versus a democracy (the excluded category) is more likely to initiate a violent dispute than any other combination of regime types.

Chapter 4 detailed various ways to measure demographic pressure including individual 'pressure' variables, an index of demographic pressure, and a factor score created using factor analysis. Though I intend to use the factor score throughout the remainder of this analysis because I believe that it most thoroughly measures demographic pressure, I present the alternate measurements in Table 6.6. Models 6.2-6.6 test one demographic factor at a time to assess their individual impacts on the likelihood of inter-state conflict. Though the control variables perform similarly across these models, only *population growth* and *youth to adult ratio* are positive and statistically significant in their respective models. The other three individual factors are positive and *urbanization* just misses statistical significance at the 0.05 level; however, I cannot strongly conclude that these factors are individually significant predictors of inter-state conflict.

Table 6.6. Impact of Demographic Factors on Violent Dispute Initiation

	Model 6.1	Model 6.2	Model 6.3	Model 6.4	Model 6.5	Model 6.6
Constant	-3.25* (0.82)	-5.22* (0.89)	-11.70* (1.59)	-3.71* (0.87)	-2.41* (0.93)	-3.57* (0.82)
Affinity	-1.02* (0.25)	-0.97* (0.25)	-1.04* (0.24)	-1.04* (0.25)	-1.03 (0.26)	-1.01* (0.25)
Contiguity	2.30* (0.23)	2.24* (0.23)	2.14* (0.24)	2.30* (0.23)	2.28* (0.23)	2.34* (0.23)
Joint Alliance	0.23 (0.17)	0.23 (0.17)	0.23 (0.16)	0.25 (0.17)	0.17 (0.17)	0.22 (0.17)
Joint Democracy	-0.75* (0.25)	-0.70* (0.24)	-0.60* (0.23)	-0.78* (0.25)	-0.71* (0.24)	-0.85* (0.25)
Joint Non-democracy	-0.41* (0.17)	-0.43* (0.17)	-0.38* (0.16)	-0.38* (0.17)	-0.35* (0.17)	-0.42* (0.17)
Democracy$_i$-Non-democracy	-0.60* (0.20)	-0.58* (0.20)	-044* (0.20)	-0.63* (0.20)	-0.58* (0.20)	-0.63* (0.21)
Civil Conflict$_j$	0.75* (0.14)	0.72* (0.13)	0.68* (0.13)	0.71* (0.14)	0.74* (0.14)	0.71* (0.14)
Relative Capabilities$_i$	0.85* (0.19)	0.89* (0.20)	0.98* (0.20)	0.77* (0.20)	0.79* (0.20)	0.74* (0.21)
Trade Dependence$_{ij,t-1}$	3.50 (2.59)	4.07 (2.31)	3.89 (2.53)	3.29 (2.80)	3.77 (2.59)	3.86 (2.49)
Total Trade$_{i,t-1}$	-1.16* (0.47)	-1.49* (0.48)	-1.40* (0.48)	-1.18* (0.49)	-1.37* (0.48)	-1.28* (0.47)
Economic Growth$_i$	-0.05* (0.01)	-0.05* (0.01)	-0.04* (0.01)	-0.05* (0.01)	-0.04* (0.01)	-0.05* (0.01)
Time since last initiation$_i$	-0.43* (0.05)	-0.42* (0.05)	-0.41* (0.05)	-0.43* (0.05)	-0.43* (0.05)	-0.43* (0.05)
State Wealth$_{i,t-1}$	-0.06 (0.10)	0.13 (0.10)	0.64* (0.15)	-0.02 (0.10)	-0.22 (0.12)	-0.03 (0.10)
Demographic Pressure variables (H5)						
Population Growth$_i$		1.84* (0.46)				
Youth to Adult Ratio$_i$			0.75* (0.13)			
Population Density$_i$				0.46 (0.39)		
Urbanization$_i$					0.10 (0.05)	
Refugees$_i$						0.20 (0.11)
N	54,693	54,570	54,673	54,263	54,590	52,764
Chi-square	832.32*	866.90*	898.14*	824.21*	848.07*	811.34*
Pseudo R^2	0.1917	0.1964	0.2010	0.1886	0.1931	0.1899

Dependent variable is *Violent Initiation*. Cell entries are logistic estimates with robust standard errors clustered on dyad in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

Model 6.7 in Table 6.7 presents all 'pressure' variables together in the same model to assess how these factors work together to predict violent conflict. Despite moderate levels of correlation (see Chapter 4), two of the variables, *youth to adult ratio* and *population density* are statistically significant predictors of an increased likelihood of violent conflict initiation. While the other three demographic variables are not statistically significant, the signs of the coefficients are in the expected direction. Comparing this model with those in Table 6.6 highlights one of the main dangers in assessing demographic pressure only with the 'pressure' measures. *Population growth* was statistically significant when considered alone, but insignificant when considered with the other measures. Conversely, *population density* was insignificant alone, but it was significant when assessed with the other factors. One could argue that multicollinearity is driving the results of Model 6.7, but only testing one factor at a time might obscure how these factors may work together to affect inter-state conflict. For this reason, I turn to the two composite measures of demographic pressure to test H5, the relationship between demographic pressure and inter-state conflict.

In Model 6.8 the index of demographic pressure is used to test the first hypothesis. Unlike the previous models, demographic pressure in this model is captured by only one variable. While the other variables in the model perform similarly to the base model, the index of demographic pressure is positive and statistically significant, lending support to the first hypothesis in this chapter, H5. In this model, having more 'pressure' variables within a state that are above average for the full sample is associated with an increased likelihood of inter-state conflict.

Table 6.7. Impact of Demographic Pressure on Violent Dispute Initiation

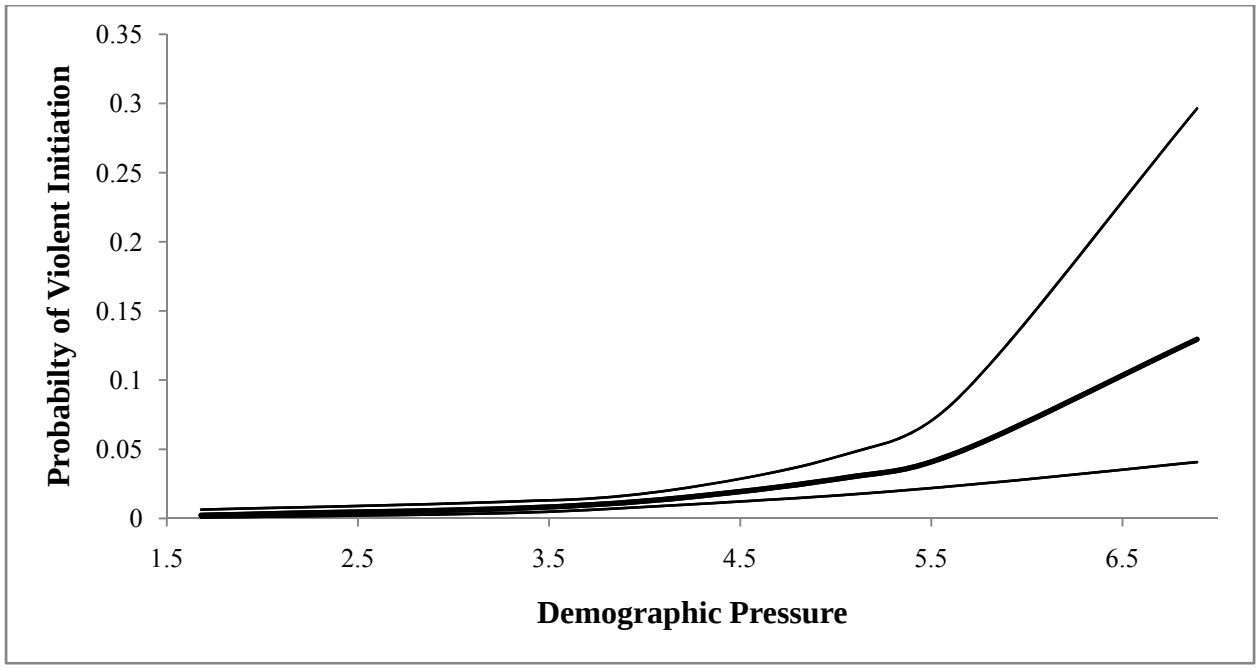
	Model 6.7	Model 6.8	Model 6.9
Constant	-12.71* (1.74)	-4.87* (0.86)	-11.93* (2.28)
Affinity	-1.01* (.245)	-0.99* (0.26)	-1.01* (0.24)
Contiguity	2.16* (0.24)	2.27* (0.23)	2.23* (0.24)
Joint Alliance	0.20 (0.16)	0.21 (0.17)	0.29 (0.17)
Joint Democracy	-0.72* (0.23)	-0.79* (0.25)	-0.77* (0.248)
Joint Non-democracy	-0.28 (0.17)	-0.31 (0.18)	-0.45* (0.17)
$Democracy_i$-*Non-democracy*	-0.49* (0.20)	-0.56* (0.21)	-0.54* (0.20)
Civil Conflict$_j$	0.55* (0.14)	0.62* (0.15)	0.66* (0.14)
Relative Capabilities$_i$	0.72* (0.22)	0.69* (0.21)	0.94* (0.22)
Trade Dependence$_{ij,t-1}$	4.47 (2.86)	4.41 (2.50)	3.82 (2.61)
Total Trade$_{i,t-1}$	-1.88* (0.52)	-1.56* (0.50)	-1.23* (0.48)
Economic Growth$_i$	-0.04* (0.02)	-0.05* (0.01)	-0.05* (0.01)
Time since last initiation$_i$	-0.41* (0.05)	-0.43* (0.05)	-0.42* (0.05)
State Wealth$_{i,t-1}$	0.65* (0.18)	0.07 (0.10)	0.55* (0.17)
Demographic Pressure variables (H5)			
Population Growth$_i$	0.65 (0.57)		
Youth to Adult Ratio$_i$	0.71* (0.13)		
Population Density$_i$	1.10* (0.39)		
Urbanization$_i$	0.09 (0.06)		
Refugees$_i$	0.14 (0.10)		
Demographic Pressure (Index)		0.27* (0.07)	
Demographic Pressure (Score)			0.82* (0.21)
N	52,327	52,327	52,327
Chi-square	891.20*	816.02*	783.31*
Pseudo R^2	0.1988	0.1887	0.1898

Dependent variable is *Violent Initiation*. Cell entries are logistic estimates with robust standard errors clustered on dyad in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

Finally, in Model 6.9 I utilize the measure of demographic pressure created using factor analysis that will be used for the remainder of this analysis. In this model, *demographic pressure* is statistically significant and positive, indicating that demographic pressure increases the likelihood of violent inter-state dispute initiation. *State wealth*, though highly correlated with demographic pressure, achieves statistical significance while the remaining variables perform similarly to the base model.[122] Thus, this model, like the previous model, lends support to the first hypothesis of this chapter, H5.[123] However, other than determining the sign and statistical significance of demographic pressure, these models do not provide much information about the substantive impact of demographic pressure on violent dispute initiation. Therefore, using the information from Model 6.9, I calculate the probability of violent dispute initiation at various values of demographic pressure.

[122] Some might be concerned that the results of Model 6.9 are driven by the multicollinearity between *state wealth* and *demographic pressure*, though multicollinearity typically inflates the standard errors of the highly correlated variables, making the achievement of statistical significance more difficult. Therefore, Appendix D replicates Model 6.9, but replaces the measure of demographic pressure with the factor score created from the unweighted individual factors. See Chapter 4 for more detail regarding how the two measures were created.

[123] See Appendix C as a robustness check that the impact of *demographic pressure* is not merely a function of the specification of the dependent variable.



All continuous variables set at mean values; *Contiguity*=1, *Joint Alliance*=0, *Civil War in Target*=0, regime dummies all equal zero, therefore, results capture scenario of non-democracy versus democracy, the excluded category.

Figure 6.1. Predicted Probability of Violent Inter-state Initiation

Figure 6.1 illustrates the impact of demographic pressure on the probability of violent inter-state dispute initiation across different values of demographic pressure.[124] Keeping in mind that violent inter-state dispute initiation is a very rare event,[125] the probability of such an initiation at the lowest amount of demographic pressure (1.68)[126] is approximately 0.22%. At the mean level of demographic pressure, however, the probability of inter-state dispute initiation increased to 1.32%. Finally, at the maximum value of demographic pressure in the sample

[124] These probabilities were calculated with *Joint Alliance* set at zero, *Civil Conflict in Target* set at zero, *Contiguity* set at one, and all of the regime type dummies set at zero (meaning that autocracies were set against democracies). All other variables were set at their mean values. The probability of violent inter-state dispute initiation approximately doubled when *Civil Conflict in Target* was set at one. Calculating the probabilities of democracy versus democracy reduced the likelihood of dispute initiation at all levels of demographic pressure, while 'turning on' the other two regime dummies (non-democracy versus non-democracy and democracy versus non-democracy) also changed the results significantly because those regime dummies were significantly different than the excluded category in Model 6.9. See Appendix E for the results of these analyses.

[125] In this sample, the dependent variable equals "1" in less than one percent of observations. See Table 6.5.

[126] This corresponds with the score for Australia in 1997, a wealthy, developed country with very low population density (just over 2 people per square kilometer), and in that year, a negative growth rate. In 1997 Australia did not initiate a violent inter-state dispute against any other countries.

(6.89),[127] the probability of a violent inter-state dispute initiation is 13.05%. Table 6.8 provides a summary of the predicted probabilities at various levels of demographic pressure. The second column in Table 6.8 presents the change in the predicted probability of an inter-state initiation based on changes from the mean of *demographic pressure*.[128]

Table 6.8. Predicted Probability of a Violent Inter-state Dispute Initiation

Model Parameters[a]	*% Probability of Violent Dispute Initiation (Change from minimum value)*	*Change from mean value of demographic pressure*
Demographic pressure at minimum value	0.22 --	-0.83
Demographic pressure at 25th percentile	0.69 (+214%)	-0.48
Demographic pressure at mean	1.32 (+500%)	--
Demographic pressure at 75th percentile	2.90 (+1218%)	+1.20
Demographic pressure at maximum value	13.05 (+5832)	+8.89

[a] Unless otherwise stated, continuous variables are set at their mean value, *Contiguity* is set at 0, *Joint Alliance* is set at 0, *Civil Conflict in Target* is set at 0, and the regime dummies are set such that Autocracy v. Democracy is 'turned on' (all included dummy variables are set at zero).

[127] Rwanda achieved the highest demographic pressure score in 1998. A poor country, Rwanda was also densely populated (over 277 people per square kilometer) with a large growth rate (over 10%) a large ratio of 15-24 year olds to the total adult population (38.7), and it housed refugees from neighboring states. In 1998, Rwanda initiated a violent inter-state dispute against the Democratic Republic of Congo.

[128] In Chapter 5, the Proportional Reduction in Error was calculated and determined how much better a model with demographic pressure predicted conflict than simply choosing the modal category. In this chapter, because over 99% of observations are in modal category (0), it is impossible to improve the accuracy of prediction. The inability to use PRE to support the substantive impact of demographic pressure is a function of the distribution of the dependent variable and should not be interpreted as a limitation of the model. The critiques of the chi-squared and pseudo-R^2 statistics remain valid for this analysis as well. Given these statistical limitations, I offer the statistical significance of the demographic pressure coefficient and the changes in predicted probability as evidence of the substantive impact of demographic pressure on the initiation of violent conflict.

While Model 6.9 and Figure 6.1 suggest strong evidence supporting the first hypothesis in this chapter that demographic pressure increases the likelihood of violent inter-state dispute initiation, three other hypotheses were forwarded which indicate that the impact of demographic pressure is conditioned by other characteristics of the challenger state. The results of these tests can be found in Table 6.9.

Table 6.9. Conditional Impact of Demographic Pressure on Violent Dispute Initiation

	Model 6.10	Model 6.11	Model 6.12	Model 6.13
Constant	-3.04 (-3.04)	-12.02* (2.28)	-12.66* (2.34)	-11.89* (2.54)
Affinity	-1.12* (0.25)	-1.05* (0.24)	-1.08* (0.25)	-1.15* (0.24)
Contiguity	2.14* (0.24)	2.21* (0.23)	2.19* (0.24)	2.13* (0.24)
Joint Alliance	0.27 (0.16)	0.31 (0.17)	0.26 (0.17)	0.25 (0.16)
Joint Democracy	-0.61* (0.24)	-0.80* (0.25)	0.23 (0.40)	0.12 (0.38)
Joint Autocracy	-0.39* (0.16)	-0.47* (0.17)	-0.42* (0.17)	-.38* (0.17)
$Democracy_i$-$Autocracy_j$	-0.38 (0.20)	-0.55* (0.20)	0.48 (0.38)	0.35 (0.36)
$Civil\ Conflict_j$	0.65* (0.14)	0.65* (0.14)	0.66* (0.14)	0.65* (0.14)
$Relative\ Capabilities_i$	1.03* (0.21)	0.90* (0.21)	0.99* (0.21)	1.03* (0.21)
$Trade\ Dependence_{ij,t-1}$	3.85 (3.04)	**18.74*** **(6.87)**	4.01 (2.73)	3.83 (3.08)
$Total\ Trade_{i,t-1}$	-1.04* (0.51)	-1.21* (0.45)	-1.09* (0.48)	-0.94 (0.49)
$Economic\ Growth_i$	-0.05* (0.01)	-0.05* (0.01)	-0.05* (0.01)	-0.05* (0.01)
$Time\ since\ last\ initiation_i$	-0.42* (0.05)	-0.42* (0.05)	-0.42* (0.05)	-0.42* (0.05)
$State\ Wealth_{i,t-1}$	**-0.49** **(0.54)**	0.56* (0.17)	0.64* (0.18)	0.64* (0.18)
$Level\ of\ Democracy_i$			0.12* (0.05)	**0.15** **(0.18)**
$Level\ of\ Democracy_i^2$			-0.009* (0.003)	**-0.018** **(0.012)**
$Demographic\ Pressure_i$	**-0.97** **(0.93)**	**0.86 *** **(0.21)**	0.80* (0.21)	**0.67*** **(0.31)**
$Demographic\ Pressure_i$ * $State\ Wealth_{i,t-1}$ **(H6)**	**0.21*** **(0.10)**			
$Demographic\ Pressure_i$ * $Trade\ Dependence_{ij,t-1}$ **(H7)**		**-4.09*** **(2.09)**		
$Demographic\ Pressure_i$ * $Level\ of\ Democracy_i$ **(H8)**				**-0.03** **(0.06)**
$Demographic\ Pressure_i$ * $Level\ of\ Democracy_i^2$ **(H8)**				**0.003** **(0.002)**
N	52,327	52,327	52,327	52,327
Chi-square	803.05*	827.68*	790.33 *	823.16*
Pseudo R^2	0.1917	0.1905	0.1923	0.1939

Dependent variable is *Violent Initiation*. Cell entries are logistic estimates with robust standard errors clustered on dyad in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

The second hypothesis, H6, proposed that wealthy states have more resources at their disposal, even when they are experiencing demographic pressure, than less wealthy states do, and therefore, they are more likely to initiate a violent inter-state dispute due to their enhanced

ability to pay for a war. With this logic in mind, I expect that an interaction of *state wealth* and *demographic pressure* will be positive. Model 6.10 presents the results of this test. The control variables in this model perform as expected with the exception of the democracy-non-democracy dummy variable, which is statistically indistinguishable from zero, indicating that there is not a statistical difference in the probability of conflict initiation between the excluded category (non-democracies versus democracies) and democracies versus non-democracies. Turning to the variables intended to test H6, the insignificance of the *state wealth* variable indicates that when *demographic pressure* equals zero (which is theoretically possible but not in this sample), the impact of a state's wealth on conflict initiation is not statistically distinguishable from zero. Additionally, in the theoretical case of a state with zero per capita GDP,[129] the impact of demographic pressure is statistically indistinguishable from zero. The statistically significant positive coefficient on the interaction term informs us that this impact increases as wealth increases. In fact, Figure 6.2 shows that the impact of demographic pressure, conditioned on wealth, becomes significant around 7.0.[130] Thus, H6 is supported by these results: wealthy states are more likely to initiate violent inter-state disputes than are poor states.[131]

Hypothesis 7 declared that trade dependence on a potential target should reduce the likelihood that a state would initiate a violent inter-state dispute against it. Given this hypothesis, I expect that the coefficient on an interaction of *demographic pressure* and *trade*

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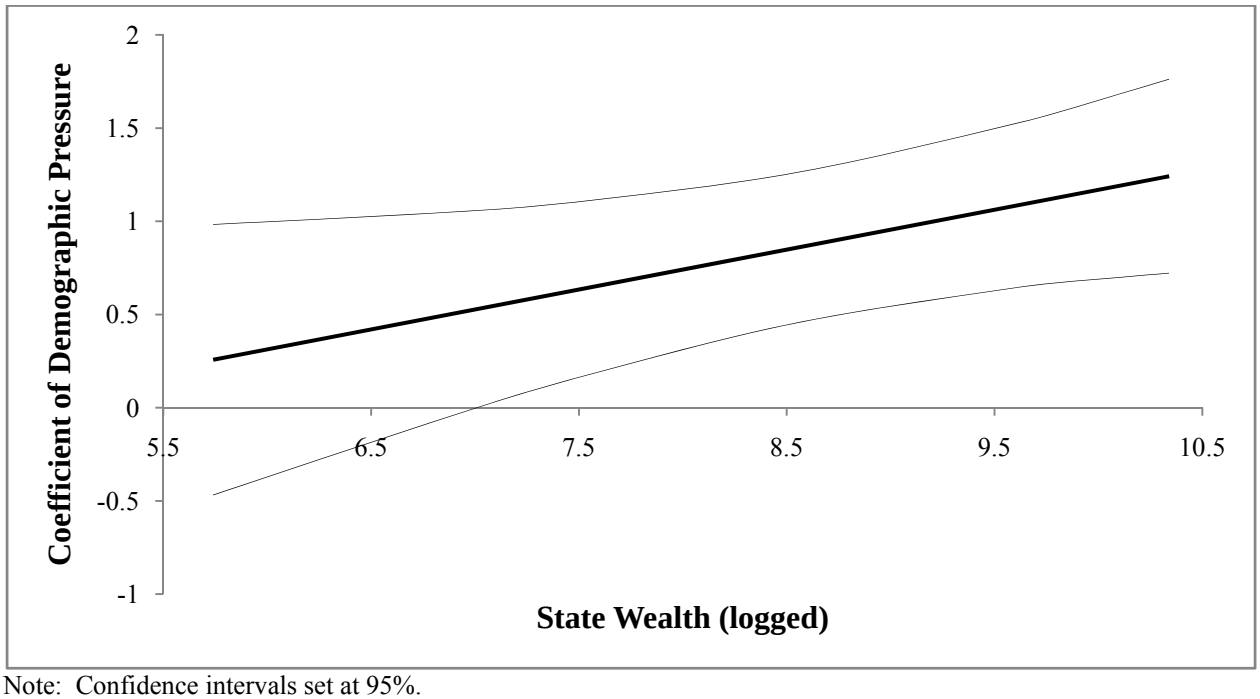
[129] It is not possible for a state to have zero income. As indicated in Table 6.5, the minimum value of logged GDP per capita in this sample is 5.74, which corresponds to approximately $310.

[130] This corresponds to approximately $1,100 in GDP per capita. Roughly 15% of the sample falls below this threshold.

[131] It is important to remember that *state wealth* is a component of demographic pressure, and it is expected that wealthy states will experience demographic pressure less frequently than will poor states. Therefore, Appendix F looks at the impact of wealth conditioned on various levels of demographic pressure. The results presented here assume that all things being equal, *including the amount of demographic pressure*, wealthy states are more likely to initiate violent disputes than poor countries, while the analysis in Appendix F varies the amount of demographic pressure.

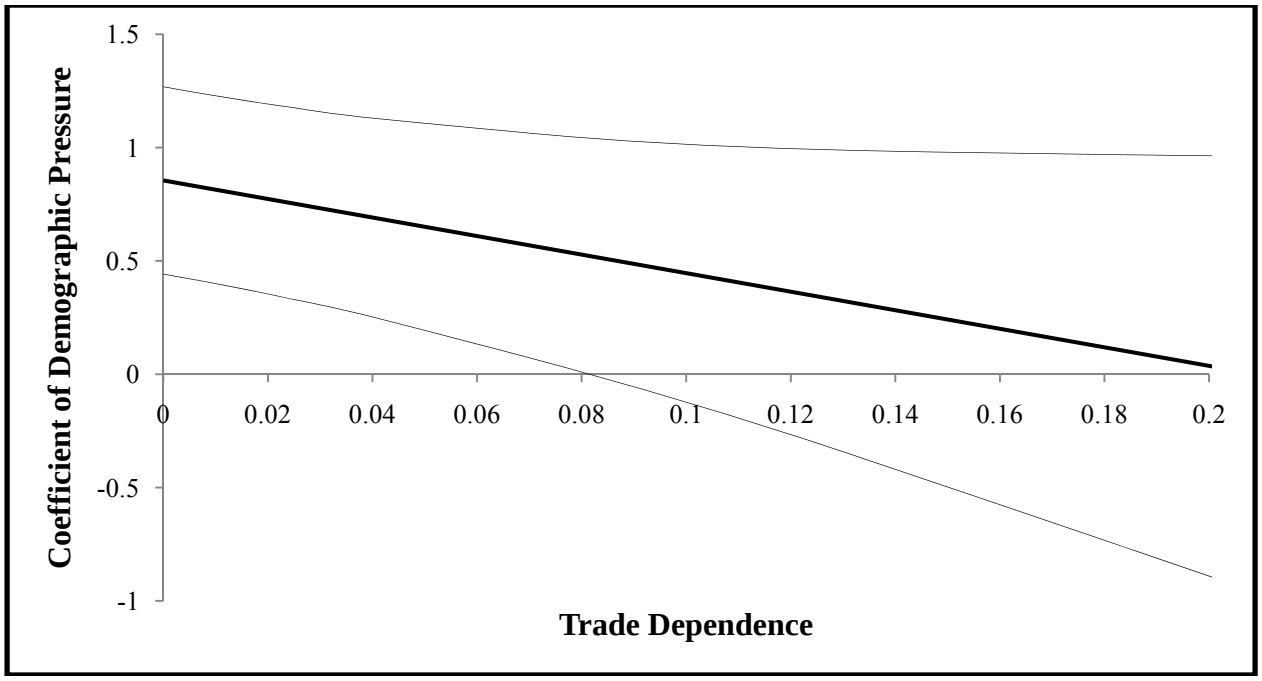
dependence should be negative. Model 6.11 confirms this expectation. When there is zero trade dependence between two states (*trade dependence* equals zero), the impact of demographic pressure is positive and statistically significant. However, as *trade dependence* increases, the impact of *demographic pressure* declines. This relationship can be understood more clearly in Figure 6.3. The declining impact of demographic pressure becomes statistically indistinguishable from zero at a *trade dependence* value of approximately 0.08,[132] lending support to H7. Two notes of caution regarding this model are needed, however. First, the point at which the impact of demographic pressure becomes statistically zero is above the 95th percentile of cases in this sample. Therefore, even though increased trade dependence reduces the likelihood of violent dispute initiation, the impact (though diminishing) is felt through relatively high levels of trade dependence.



Note: Confidence intervals set at 95%.

Figure 6.2. Impact of Demographic Pressure on Violent Inter-state Dispute Initiation, Conditioned on State Wealth

[132] Remember that *Trade Dependence* is imports from the target plus exports to the target, divided by the GDP of the challenger.



Note: Confidence intervals set at 95%.

Figure 6.3. Impact of Demographic Pressure on Violent Inter-state Dispute Initiation, Conditioned on Trade Dependence

Second, the positive, statistically significant coefficient for the trade variable suggests that when *demographic pressure* is zero, the impact of trade dependence exerts a *positive* impact on the likelihood of conflict initiation which *declines* as demographic pressure increases. Though I do not explicitly test the impact of trade dependence on conflict initiation, this result may strike some as counter-intuitive.[133] If demographic pressure is positively associated with trade partners engaging in conflict against each other, I would expect that it would be more likely at high levels of demographic pressure, not at low levels, as suggested by Model 6.11. Space limitations prevent me from exploring this result in more detail; however, it is important to determine whether this result is a function of the model's specification, or if demographic

[133] Barbieri (1996) has found that trade dependence is associated with higher levels of conflict; however, her study is a rare exception to the general finding that trade reduces conflict among trading partners.

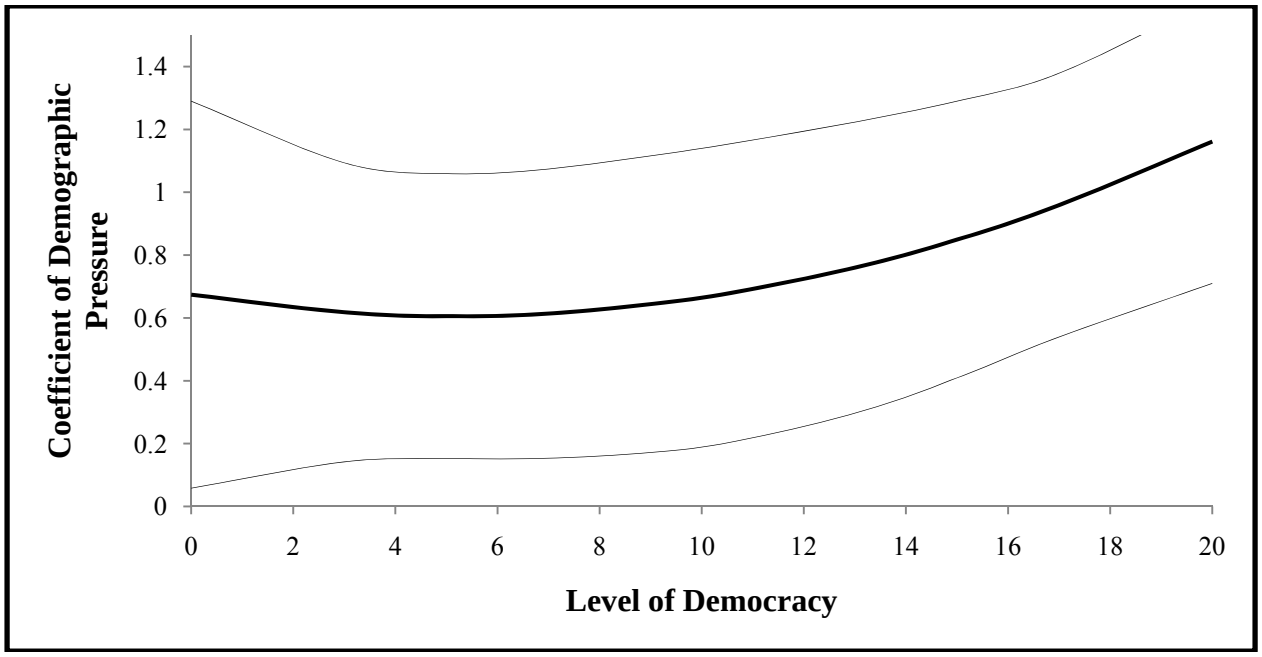
pressure decreases a state's interest in protecting its current trade relationships in such a way as to increase the state's incentives to initiate a conflict against its trade partners.

The final hypothesis states that anocracies are more likely to initiate violent inter-state disputes than are democracies and autocracies when they are experiencing demographic pressure. In order to conduct a test of this hypothesis, I first add *Level of Democracy* and its square to Model 6.9 to capture the expected non-linear relationship between *level of democracy* and conflict initiation, and present the results in Model 6.12. The only variables that are affected by this addition are the regime dummy variables, with only the joint non-democracy variable retaining its statistical significance. While the regime dummies capture the relationship between the challenger and target, *level of democracy* measures the level of democracy only in the challenger. This variable is expected to be correlated with the regime dummies, and therefore, by including all four variables (three regime dummies and *level of democracy*) in the model, I may be inducing some multicollinearity.[134] The opposing signs on the democracy variable and its square, in addition to their statistical significance, confirm the assumption that a state's level of democracy is non-linearly related to its likelihood of conflict initiation. With this relationship in mind, I now turn to the test of the final hypothesis.

Because both *level of democracy* and its square are included in Model 6.12, *demographic pressure* must be interacted with both terms in order to test H8. Therefore, Model 6.13 includes both *demographic pressure*level of democracy*$_i$ and *demographic pressure*level of democracy*$_i^2$. When *level of democracy* is zero (least democratic), demographic pressure exerts a statistically significant positive impact of the likelihood of violent inter-state dispute initiation, i.e., the

[134] *Level of democracy* is correlated with the regime dummies in the following manner: *Joint democracy* (0.50), *Democracy-non-democracy* (0.53), and *Joint non-democracy* (-0.60). Estimating Models 6.12 and 6.13 without the regime dummies leads to similar results, while losing the information about the potential target that the regime dummies provide. See Appendix G for the results of these alternate tests.

coefficient of *demographic pressure* is positive and statistically significant. The *level of democracy* variables are not significant, suggesting that when *demographic pressure* is zero, the relationship between regime type and conflict initiation is not curvilinear.



Note: Confidence intervals set at 95%.

Figure 6.4. Impact of Demographic Pressure on Violent Dispute Initiation, Conditioned on Level of Democracy

The inclusion of the interaction between *demographic pressure* and *level of democracy* and its square complicates the interpretation of these effects. Neither of the two interaction terms is statistically significant, indicating that the level of democracy does not condition the impact of demographic pressure. Additionally, the negative sign on *level of democracy*demographic pressure* and the positive sign on the other interaction term suggest that if these variables had been significant, they would have produced a result counter to expectations: a higher probability of inter-state initiation for autocracies and democracies than for anocracies. This can be seen in Figure 6.4. In fact, this figure seems to suggest that the impact of demographic pressure is strongest for consolidated democracies (*level of democracy*=20).

Figure 6.5 parses out the impact of *demographic pressure* conditioned on *level of democracy* by assessing the probability of violent initiation across various levels of democracy and demographic pressure. This figure highlights that high levels of demographic pressure translate into higher probabilities of conflict for all regime types; however, the relatively flat slopes of the probability lines support the conclusion that the impact of demographic pressure does not vary significantly across regime type, a result that leaves H8 unsupported by the empirical evidence.

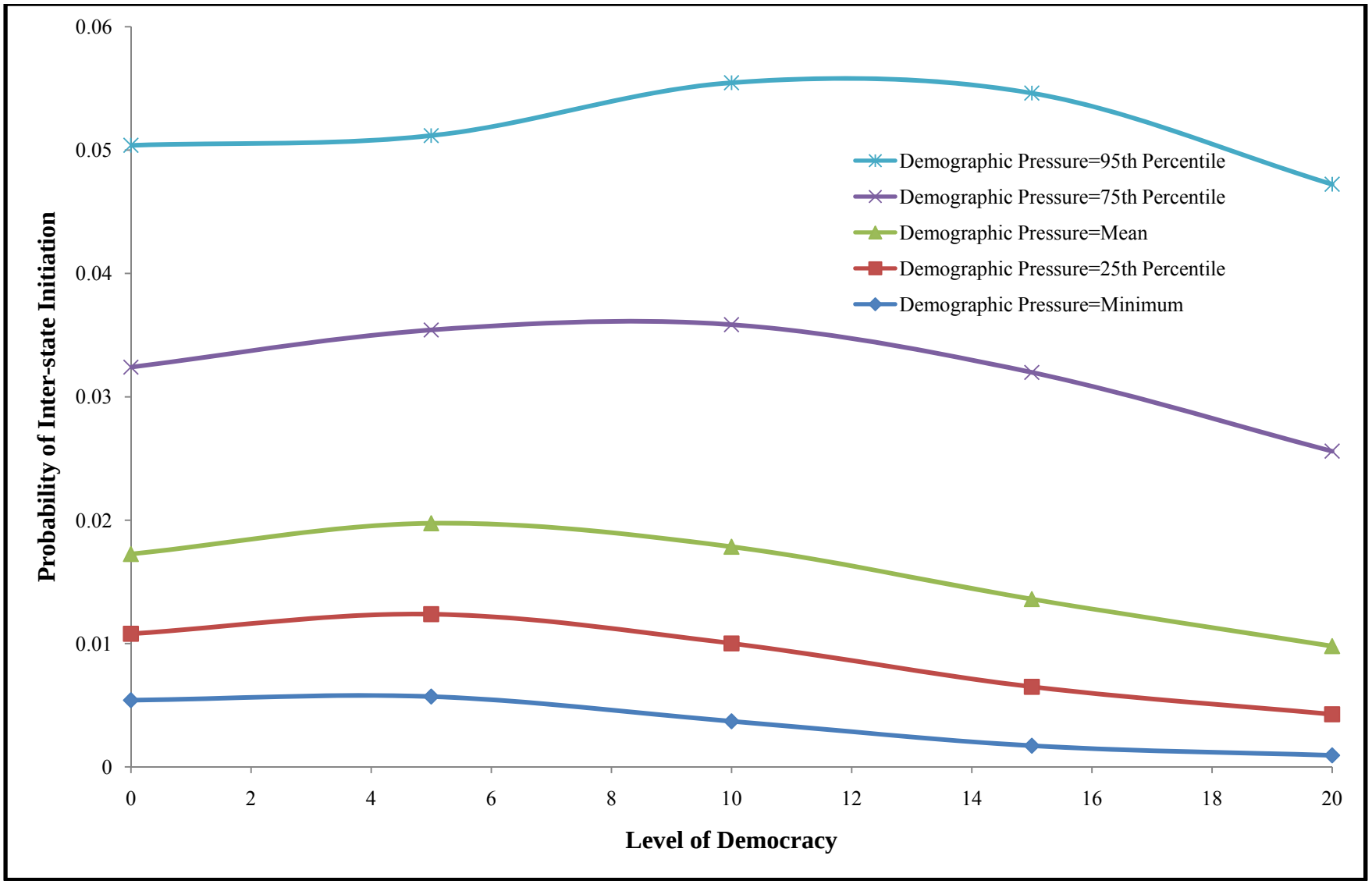


Figure 6.5. Probability of Violent Dispute Initiation at Various Levels of Democracy and Demographic Pressure

6.4 DISCUSSION

The results in this chapter illustrate that demographic pressure plays a significant role in explaining violent inter-state dispute initiation. This result is robust over different specifications of demographic pressure as well as various specifications of the dependent variable. Additionally, this chapter highlighted that state wealth increases the likelihood of conflict initiation while trade dependence reduces it. No empirical evidence was found to support the hypothesis that regime type conditions the impact of demographic pressure. I revisit Table 6.1 which summarized the hypotheses proposed, and I add the results, as discovered in this chapter, to create Table 6.10 below. In the remainder of this section, I will briefly discuss each of these results.

First, the main hypothesis of this chapter focused on the impact of demographic pressure on inter-state conflict. The models of Tables 6.6 and 6.7 support the assertion that demographic pressure increases the likelihood of violent inter-state dispute initiation, and that this result is robust to various specifications of this variable.[135] Analyzing this relationship with all of the 'pressure' variables included together highlighted that, despite inevitable inter-item correlations among the components, the influence they exert remains strong. The index of demographic pressure and the measure created using factor analysis also indicate the same positive and statically significant relationship between demographic factors and inter-state conflict.

[135] Appendix D also confirms that the manner of creating the measure of demographic pressure using factor analysis does not affect the significant impact of demographic pressure on conflict initiation.

Table 6.10. Hypotheses, Empirical Expectations, and Results

Hypothesis	*Variable of Interest*	*Empirical Expectation*	*Result*
H5	*Demographic Pressure*	+	Supported
H6	*Demographic Pressure * State Wealth*	+	Supported
H7	*Demographic Pressure * Trade Dependence*	-	Supported
H8	*Demographic Pressure * Level of Democracy*	+/-	Unsupported

The second result, dealing with the impact of state wealth, also confirmed expectations. H6, consistent with lateral pressure accounts of inter-state conflict, stated that *state wealth* would increase the likelihood of violent inter-state dispute initiation. This result may cause concern in some camps, especially those which advocate economic development as a means of reducing conflict. Because wealth is an important component of demographic pressure, wealthy states are not expected to experience demographic pressure as easily as their less wealthy counterparts. Indeed, state wealth and demographic pressure are negatively correlated at a high level (-0.93). Therefore, when wealthy states experience demographic pressure, it is a rare event. Appendix E illustrates that wealth does not exert a significant impact on violent inter-state dispute initiation until demographic pressure is approaching the mean value in the sample. At lower levels of demographic pressure, wealth does not have a significant role in explaining violent inter-state dispute initiation.[136]

H7 proposed that a high percentage of trade with a potential target would reduce the incentive of a challenger to initiate a violent inter-state dispute. This hypothesis was supported,

[136] In this sample, only four members of the Organization for Economic Cooperation and Development (OECD) had demographic pressure values above the mean at some point in the 1961-99 time span: Japan in the 1960s, Portugal in the 1960s and 1970s, Mexico in the late 1990s, and Turkey throughout the period. Of these countries with above average demographic pressure scores, Portugal and Turkey together have initiated 20 violent inter-state disputes, with Turkey initiating 16 and Portugal 4.

indicating that states are more hesitant to lose the benefits of trade, especially with those on whom they depend, by attempting to acquire resources by force as the result of military action.

The final set of results speaks to the conditioning impact of the level of democracy. H4 suggested that states with the ability to repress their domestic population (autocracies) might have less incentive to extend outwards to acquire additional resources, but rather, they would suppress internal demand through repressive techniques. Democracies which rely more on public support than autocracies, would be less able to avail themselves of this internal option, but they are also constrained by domestic institutions from initiating military conflicts. Anocracies, those states that mix the characteristics of both democracies and autocracies, however, might want to repress their people in the presence of increased demand for public goods and services, but they have to rely on the support of some of the public to remain in power. This prevents them from engaging in full-scale repression, but they are also unconstrained institutionally from initiating external conflicts, and would, thus, have a greater incentive to initiate violent inter-state disputes.

Both the tests presented in this chapter and in Appendix F indicate that there is at least a weak non-linear relationship between a state's level of democracy and its likelihood to initiate a violent inter-state dispute: anocracies are more likely to initiate disputes than are autocracies and democracies. H8 focused on the impact of demographic pressure, conditioned on regime type, with the expectation that when demographic pressure is present, not only would this non-linear relationship remain, but demographic pressure would exaggerate the difference between anocracies' and other regime types' probabilities of dispute initiation. Unfortunately, the empirical results did not support this hypothesis. While all regime types had a higher probability of conflict as demographic pressure increased, at each level of demographic pressure, there was

no significant difference across regime types. Thus, demographic pressure impacts all regime types in a similar manner, an important result, even it was not the hypothesized one.

Finally, the hypotheses forwarded in this chapter deal with the motivations for states to initiate violent disputes against other states. They do not suggest predictions for how effectively such disputes are executed, or their likelihood of success. The state-society explanation of conflict behavior forwarded in Chapter 3 suggests that states initiate conflicts against other states to respond to the internal demands placed on governments by members of society when the state has an unsustainable demographic profile. Inter-state initiation is viewed as a strategy to address domestic concerns before those concerns spark domestic rebellion against the government. The next section addresses whether this strategy may work by re-assessing the predictors of civil conflict and adding a previous inter-state initiation.

6.5 DOES INTER-STATE CONFLICT INITIATION PREVENT CIVIL CONFLICT?

Section 3.4 detailed how inter- and intra-state conflict are expected to be related in the presence of demographic pressure. Building on Starr (1994), I argue that demographic pressure leads to popular grievances against the government as states' abilities to respond to societal demand decreases. Such grievances provide a strong motivation to replace the government or secede from the state. Rational leaders who wish to remain in power recognize the threat posed by societal grievances and seek to prevent 'revolution' by going to 'war'. Therefore, societal groups can observe the external military action and update their preferences based on this state action. A successful military campaign might bring needed resources to alleviate the demographic pressure. On the other hand, an unsuccessful campaign may serve only to deplete

the state's resources further. Additionally, the pre-occupation of the government with its external actions may provide an opportunity for societal groups to act.

These arguments suggest that inter-state military conflict could either increase or decrease the likelihood of civil conflict. Shearer (1999: 101) argues that Rwanda invaded the DRC in 1998 in attempt to reduce domestic unrest at home and remove security threats from its border; however, while initial reductions in internal violence were reported, "by carrying its war outside its own borders, Rwanda may have worsened its own security." Despite the plausible alternative suggestion that external conflict may lead to an increase in internal conflict, I argue that states engage in external conflict in order to prevent domestic conflict, leading to a final hypothesis:

> H9: The impact of demographic pressure should decrease if the government has recently initiated an inter-state conflict.

To test this hypothesis, I re-introduce Model 5.9 which tested H1 in Chapter 5. To this model, I add *violent inter-state initiation*$_{t-1}$. This variable is coded "1" if the state initiated a violent inter-state dispute in the previous year and "0" otherwise. I lag this variable, the dependent variable from Chapter 6, so as to maintain temporal consistency. I want to determine whether 'war' prevents 'revolution' so I need to ensure that external conflict occurs temporally prior to any civil conflict.

Table 6.11. Does inter-state conflict reduce civil conflict?

	Model 6.14	Model 6.15	Model 6.16	Model 6.16
Constant	-18.72* (2.74)	-18.91* (2.77)	-16.74* (2.87)	-17.50* (2.93)
Population (logged)	0.47* (0.06)	0.47* (0.06)	0.39* (0.07)	0.42* (0.07)
Capabilities	-21.95* (4.63)	-22.45* (4.62)	-19.17* (4.96)	-21.88* (4.87)
Economic Growth	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Time Since Last Conflict	-1.77* (0.12)	-1.77* (0.12)	-1.68* (0.11)	-1.69* (0.11)
Total Trade$_{t-1}$	-1.93* (0.61)	-1.92* (0.61)	-2.16* (0.66)	-2.13* (0.68)
State Wealth$_{t-1}$	0.85* (0.19)	0.85* (0.19)	0.80* (0.20)	0.80* (0.20)
Level of Democracy	0.17* (0.05)	0.17* (0.05)	0.17* (0.06)	0.17* (0.06)
Level of Democracy (squared)	-0.01* (0.003)	-0.01* (0.003)	-0.01* (0.003)	-0.01* (0.003)
Ethnic Fractionalization	3.19* (1.13)	3.15* (1.13)	3.00* (1.19)	2.82* (1.21)
Ethnic Fractionalization (squared)	-2.58* (1.17)	-2.54* (1.17)	-2.45* (1.23)	-2.25 (1.25)
Demographic Pressure	0.91* (0.22)	**0.93*** **(0.22)**	0.86* (0.23)	**0.96*** **(0.23)**
Violent inter-state initiation$_{t-1}$	0.33 (0.20)	**0.93** **(1.02)**		
*Demographic Pressure** *Violent inter-state initiation$_{t-1}$* **(H9)**		**-0.13** **(0.23)**		
Violent inter-state initiation$_{t-2}$			0.10 (0.21)	**3.34*** **(1.08)**
*Demographic Pressure** *Violent inter-state initiation$_{t-2}$* **(H9)**				**-0.69*** **(0.23)**
N	3978	3978	3875	3875
Chi-square	942.65*	940.37*	1001.17*	994.21*
Pseudo R^2	0.5642	0.5643	0.5764	0.5787

Dependent variable is *Civil Conflict* unless otherwise noted. Cell entries are logistic estimates with robust standard errors in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

Model 6.14 in Table 6.11 presents the results of this model. The coefficient for *demographic pressure* is positive and statistically significant, indicating that, controlling for external conflict in the previous year (and all other independent variables), demographic pressure is associated with an increasing likelihood of civil conflict. The insignificant coefficient on the violent conflict variable suggests that inter-state conflict in the previous year does *not* impact the likelihood of civil conflict; however, this unconditional model does not accurately test H9. H9 suggests that a previous inter-state initiation should reduce civil conflict when the state is experiencing demographic pressure. This requires a model in which *demographic pressure* is interacted with inter-state initiation in the previous year.

In Model 6.15 *demographic pressure* is again positive and statistically significant, suggesting that when there has not been a inter-state initiation in the previous year, *demographic pressure* exerts a positive impact on the likelihood of civil conflict. When *demographic pressure* equals zero, the impact of an inter-state initiation in the previous year is indistinguishable from zero. The coefficient of the interaction term is negative, which indicates that the probability of a civil conflict is lower for states that *did* initiate a violent inter-state conflict in the previous year than for states that did not; however, the failure of this coefficient to achieve statistical significance implies that this reduction in the conflict probability is negligible.

Because it is not obvious that the benefits of external conflict would be felt immediately, especially if the conflict lasts several years, I estimated two additional models in which I lagged external conflict initiation by two time periods. The results of these tests can be found in Models 6.16 and 6.17 in Table 6.11.[137] The unconditional model (6.16) produces similar results to Model 6.14: *demographic pressure* is significantly associated with an increased likelihood of

[137] The number of observations is reduced in these models because one year (1961) was lost in order to lag the inter-state conflict variable two years.

civil conflict, controlling for all other variables, while an external conflict initiation (lagged two years) exerts no significant impact on the likelihood of civil conflict. In Model 6.17, however, stronger support for H9 is found. In this model, *demographic pressure* is positive and statistically significant, indicating that demographic pressure exerts a positive impact on the likelihood of civil conflict when a state has not begun an external military conflict. The interaction term in this model, unlike in Model 6.15, is negative and significant, suggesting that when a state has initiated a previous external conflict, the impact of demographic pressure is lower than in the case of no previous external conflict. To determine the effect of demographic pressure in this scenario, I added the coefficients for *demographic pressure* and the interaction term, which resulted in an insignificant conditional effect. These results support the empirical expectations of H9, that a previous inter-state conflict initiation would reduce the likelihood of civil conflict.

The models in Table 6.11 provide moderate support for H9, an important finding that links inter- and intra-state conflict behavior. This result is especially interesting because Starr (1994) argued that such external military conflict might distract governments from domestic problems and weaken states in relation to their internal opposition. Additionally, external conflict is frequently a costly enterprise, and it is reasonable to assume that during times of demographic pressure, the diversion of resources away from domestic spending toward the prosecution of an external military campaign would lead to or increase grievances of the population against the government, which could lead to civil violence. These alternate stories linking external military conflict with internal conflict suggest a *positive* relationship between these variables, a result that was not supported by Models 6.15 and 6.17. I do not wish to overstate the support for H9, especially considering that the negative interaction between

demographic pressure and previous external conflict may be affected by the number of lags of inter-state conflict employed. Additionally, it is possible that other factors not tested here might impact this relationship. One major factor that Starr (1994) highlights is that the *success* of any external military conflict may affect the reaction of the domestic population. Because it is unclear how many of the inter-state initiations utilized in these models ended in success, it is difficult to distinguish whether the reduction in the probability of a civil conflict is a function of all external military action, or the successfully prosecuted external actions.

The support for H9 does raise some troubling questions for those who seek to reduce all types of conflict. If governments perceive that external military aggression will solve their internal problems, this may provide sufficient incentive for them to pursue such strategies, an outcome that is expected to be costly, both in terms of lives and resources. This chapter has argued that many state attributes will affect a state's willingness and opportunity to engage in external military conflict, but the finding that internal conflicts may be reduced through external conflict may provide additional justification for external military action, as was seen in Rwanda in 1998. In the following chapter, I will discuss in more detail the implications of this result, as well as recap the findings of this project, and suggest future projects based on current findings.

7.0 CONCLUSION

This analysis has investigated the theoretical and empirical relationships between demographic pressure and civil conflict and demographic pressure and inter-state conflict. In Chapter 3, I proposed eleven separate hypotheses regarding these relationships, and then tested them Chapters 5 and 6. In this chapter, I revisit these hypotheses and review whether they were supported by the empirical analysis. After completing this task for each type of conflict, I will compare the effects of the state attributes that were common to both models. Next, I briefly assess the policy implications that flow from my findings, and I conclude this chapter with a discussion of ways in which I can extend this project in order to deepen further our understanding of the impact of demographic pressure on conflict behavior.

7.1 REVIEW OF RESULTS

Before reviewing the results of the quantitative analysis performed in this project, I will briefly summarize the main theoretical framework I employed to derive the hypotheses that I tested. In Chapter 3, I argued that there is a dependent and mutually beneficial relationship that exists between the state and society. Society depends on the state to provide collective goods such as external and internal security, a justice system, and infrastructure, as well as services such as education and health services. While some countries provide a more extensive range of goods

and services than others, every functioning state provides some level of basic provision. In order to provide these goods, however, the state relies on rents received in large measure from the people. Either through direct taxation or indirectly through the profits or taxes on products produced by the people, the government extracts rents from the people and uses it to provide public goods and services.[138] Thus, society depends on the government to provide goods and services, but the government also relies on the rents from the people to pay for them.

Demographic pressure, an unsustainable demographic profile, can disrupt this virtuous circle on two levels. First, as demographic shifts occur within the population, I expect that population shifts would also lead to a shift in demands for goods and services. At the same time, increased competition for employment, or an overburdening of the land which can result from demographic shifts may lead to an inability of members of society to provide rents to the state. Therefore, an increase in demands for services and a simultaneous reduction in rents flowing to the government create 'pressure' on the government. In this circumstance, the government must determine how best to meet the shifting demands of the population with a reduced capacity to respond.

For societal groups, inadequate public goods and service provision is expected to lead to or increase previously held grievances against the government. Such grievances are necessary conditions for conflict (Lichbach 1984), and groups may prefer to replace the government with others who promise to meet society's demands, or disaffected groups may choose to secede from the territory of the state and create their own. Government leaders can observe the demands of the people for services, and because they seek to remain in power, they evaluate their option in

[138] Some governments also misappropriate these rents to provide private goods to themselves and their key supporters. Even in these countries, however, there is a minimum amount of service provision. See Höijer (2004) and Ellis and Freeman (2004) for a discussion of kleptocratic regimes.

the presence of demographic pressure. If societal grievances are great enough, leaders may fear that civil conflict could result. Though there are a number of peaceful options available to them, one option includes engaging in a military conflict in order to acquire land or resources directly or to achieve changes within a target government to alleviate their demographic pressure or help increase their domestic security. Finally, if governments pursue external military conflict to prevent domestic unrest, then the engagement in external conflict should reduce domestic conflict. If it does not, then pursuing an external conflict is at best, a poor strategy to pursue as states would have to pay the costs of war in both lives and resources without any discernable benefit. If external conflict increases domestic conflict, then it is a dangerous strategy for states to pursue.

7.1.1 Civil Conflict Hypotheses

In Chapter 5, I tested six hypotheses: a main, unconditional hypothesis linking demographic pressure and civil conflict occurrence, and five conditional hypotheses that attempted to define more specifically the conditions under which demographic pressure is expected to increase the likelihood of civil conflict. Table 7.1 replicates Table 5.12, and summarizes the empirical expectation of each hypothesis and whether it was supported by the empirical evidence.

Table 7.1. Civil Conflict Hypotheses, Empirical Expectations, and Support for Expectations

Hypothesis	*Variable of Interest*	*Empirical Expectation*	*Result*
H1	*Demographic Pressure*	+	Supported
H2	*Demographic Pressure * State Wealth*	-	Unsupported
H3	*Demographic Pressure * Level of Democracy*	+/-	Limited
H4a	*Demographic Pressure * Ethnic Fractionalization*	+/-	Unsupported
H4b	*Demographic Pressure * Number of Languages*	+	Unsupported
H4c	*Demographic Pressure * Religious Fractionalization*	+/-	Unsupported

I proposed in H1 that demographic pressure should increase the likelihood of civil conflict because it increases the grievances of societal groups against the government. This hypothesis was supported using a variety of measures for demographic pressure. First, I explored each of the five factors that I believe contribute to demographic pressure: population growth, youth-to-adult ratio, population density, urbanization and refugees. Each of these individual factors was divided by the wealth of the state to create 'pressure' measures of each factor. When tested either alone or with all five measures in the same model, only *youth-to-adult ratio* and *population density* were statistically significant. This might suggest that the other 'pressure' factors are not important predictors of civil conflict; however, I argue that these factors may work together within a state rather than work separately. Additionally, several variables were moderately correlated with each other, which may have led to their insignificance in the model with all five 'pressure' variables.

For these reasons, I also tested an index of demographic pressure and a variable created using factor analysis. These two measures combined all five 'pressure' variables in different ways. The index of demographic pressure counts the number of 'pressure' measures that are above average for each country, while the measure created using demographic pressure uses the commonalities among the 'pressure' variables to calculate a factor score which represents the shared variance among all the component parts. It was this factor score that was used in the majority of the remaining models in Chapter 5. Both these variables (index and factor score), it should be noted, were statistically significant and predicated an increase in the likelihood of civil conflict. These results in support of H1 were robust across alternate specifications of both the independent and dependent variables. When these demographic pressure variables were replaced with the factor score created from the 'raw' demographic pressure measures (the five

demographic components before they were divided by the state's wealth), the impact of demographic pressure continued to exert a positive and statistically significant impact on the likelihood of civil conflict. Also, when the main demographic factor score measure was used to predict civil conflict onset and civil war occurrence using two different data sources, demographic pressure consistently remained a significant, positive predictor of civil conflict. Thus, demographic pressure has demonstrated its robustness through various model specifications, which lends a great deal of support to H1.

After establishing the robustness of demographic pressure as an unconditional predictor of civil conflict, I tested a series of conditional hypotheses to determine if any state or society characteristics would modify the effect of demographic pressure. With H2 I proposed that the impact of demographic pressure should decrease as a state's wealth increased. H2 was not supported by the empirical analysis, primarily because unconditionally, state wealth, in these models, is associated with an *increased* likelihood of civil conflict. When the effect of demographic pressure was conditioned on the amount of state wealth, no relationship was found, meaning that demographic pressure affected the likelihood of civil conflict approximately equally for wealthy and less wealthy countries. Still, as Figure 7.1 illustrates, there is a clear negative relationship between state wealth and demographic pressure. Thus, when a state is experiencing demographic pressure, wealth does not decrease its civil conflict likelihood, but wealth states for the most part have very low levels of demographic pressure, and are therefore, societal groups in those countries are unlikely to have the motivation to pursue violent rebellion against the state.

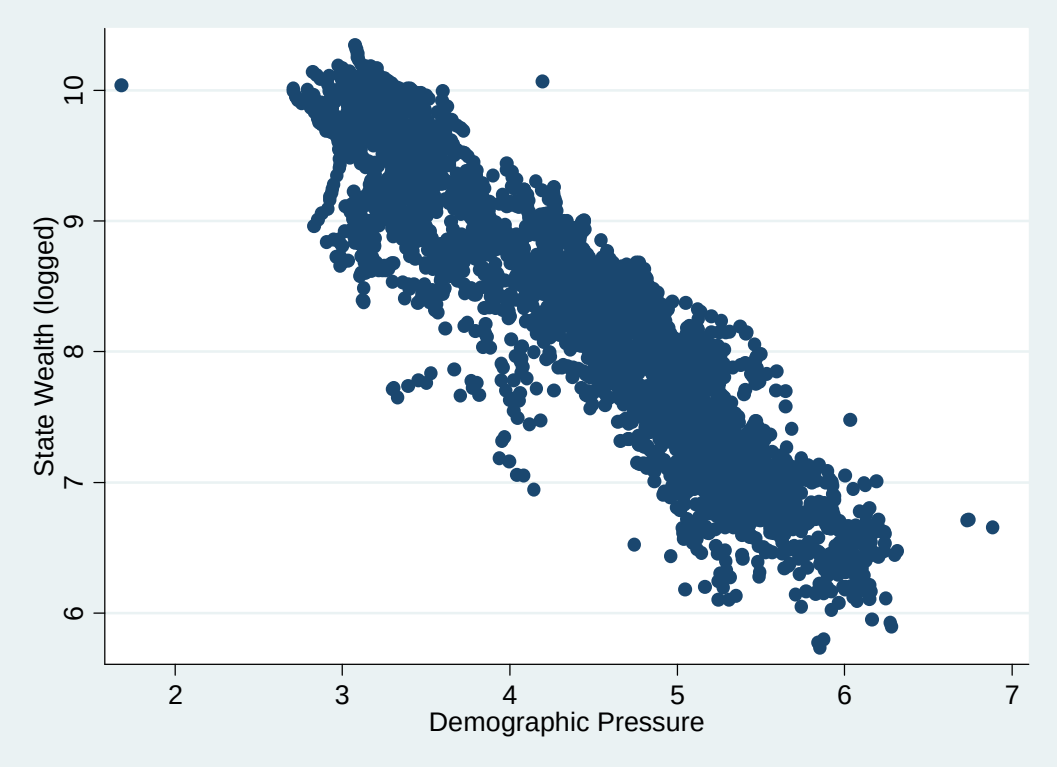


Figure 7.1. State Wealth v. Demographic Pressure

The third hypothesis, H3, tested the impact of demographic pressure, conditioned on a state's level of democracy. I expected that anocracies, regimes with characteristics of both democracies and autocracies, would have a higher likelihood of civil conflict, especially when a state experienced demographic pressure. While unconditionally, anocracies were more likely to experience civil conflict than other types of regimes, the impact of demographic pressure was not greater for those states. The empirical evidence suggests that the impact of demographic pressure declines monotonically as the level of democracy increases. While this result does not conform to the hypothesized expectation, it does not defy logic in that democracies with their open political systems through which societal grievances can be expressed are expected to find peaceful solutions to domestic conflict, more so than repressive autocratic regimes. However, according to Figure 5.3, anocracies do have a higher likelihood of civil conflict at the highest

levels of demographic pressure than other regime types. Below the 75th percentile of observations of demographic pressure, the impact of demographic pressure is not distinguishable across regime type; however above the 75th percentile, the non-linear relationship between level of democracy and civil conflict becomes quite prominent. This result provides weak support to H3, though the insignificance of the interactions terms in 5.12 and the negative linear slope of the marginal effects line if Figure 5.2 suggest that this support is quite limited.

Finally, I proposed several hypotheses suggesting that the identity characteristics of a state might condition the impact of demographic pressure on civil conflict. In H4a, I assessed the conditioning influence of ethnic fractionalization within the country. I argued that the relationship between ethnic fractionalization and civil conflict should be non-linear because homogenous and pluralistic societies should have low incidence of civil conflict because, in the former case, ethnic cleavages are not expected to exist, and in the later case, the ethnic composition of society does not determine how goods and services are allocated. It is the states between these two categories that are expected to be most prone to ethnic cleavages that might lead to collective political violence against the state. Though unconditionally, ethnic fractionalization does exhibit a non-linear relationship with civil conflict, there is little evidence to support the claim of H4a that the impact of demographic pressure would increase with increasing levels of ethnic fractionalization and then decrease as a society reached higher levels of fractionalization. In fact, the result seems to suggest the opposite: the impact of demographic pressure decreases and then increases. Figure 5.5 suggests that at low levels of demographic pressure the probability of a civil conflict increases and then decreases, but this relationship does not hold at higher levels of demographic pressure, nor is it clear that this inverted-U relationship is statistically distinguishable from a horizontal line.

I proposed a similar hypothesis for religious fractionalization, H4c, suggesting that there would be lower levels of civil conflict at both high and low levels of religious fractionalization, and that therefore, the impact of demographic pressure would be highest at moderate levels of fractionalization. This hypothesis was also not supported by the empirical evidence. As with ethnic fractionalization, the impact of demographic pressure actually declines then inclines, the opposite of the hypothesized relationship. Again, similarly to the ethnic fractionalization result, the expected non-linearity between religious fractionalization and civil conflict is observed at low levels of demographic pressure, but not at high levels. This result is not sufficient to lead me to conclude that H4c is supported by the empirical evidence.

The final hypothesis in Chapter 5 dealt with the number of languages spoken within a country. Because education is often provided only in the official languages of a state, if there are groups who speak a non-official language, they may hold many grievances against the state as their children are educated in a different language, and access to government services is often complicated if the business of the government is only conducted in official languages. For this reason, I argued that the more languages that are spoken in a country, the more likely it is that civil conflict will occur. Adding demographic pressure to this mix, the impact of demographic pressure was expected, as per H4b, to increase as the number of languages increased. Like the other two hypotheses regarding potential social cleavages, this relationship was also unsupported by the empirical evidence. In fact, the results for this hypothesis suggest that as the number of languages spoken within a country increases, the impact of demographic pressure *decreased*, a result that is directly counter than the one proposed.

The results in this chapter suggest that demographic pressure increases the likelihood of civil conflict, but it is very difficult to determine the state or societal characteristics that might

affect this propensity toward civil conflict. Each of the contradictory results in Chapter 5 suggests additional research that can be pursued to further our understanding of civil conflict. These future projects will be discussed later in this chapter. In the next section, however, I will revisit the hypotheses linking demographic pressure and inter-state conflict.

7.1.2 Inter-state Conflict Hypotheses

In Chapter 6, I tested four hypotheses: a main, unconditional hypothesis linking demographic pressure and violent inter-state conflict initiation, and three conditional hypotheses that attempted to define more specifically the conditions under which demographic pressure is expected to increase the likelihood of inter-state conflict. Table 7.2 replicates Table 6.10, and summarizes the empirical expectation of each hypothesis and whether it was supported by the empirical evidence.

Table 7.2. Inter-state Hypotheses, Empirical Expectations, and Results

Hypothesis	*Variable of Interest*	*Empirical Expectation*	*Result*
H5	*Demographic Pressure*	+	Supported
H6	*Demographic Pressure * State Wealth*	+	Supported
H7	*Demographic Pressure * Trade Dependence*	-	Supported
H8	*Demographic Pressure * Level of Democracy*	+/-	Unsupported

The first hypothesis of Chapter 6, H5, proposed that demographic pressure should increase the likelihood of external conflict initiation because governments see the mounting grievances of the domestic population and attempt to acquire resources to prevent domestic unrest. This hypothesis was tested with the same alternate specifications of the independent variable as was used in Chapter 5. When the five 'pressure' measures were tested separately, only population growth and youth-to-adult ratio were statistically significant; however, when all

five variables were placed in the same model, the youth and population density variables were significant predictors of an increased likelihood in violent dispute initiation. These results suggest that the individual 'pressure' variables may not capture the full impact of demographic pressure, and so I tested the composite measures, including the index of demographic pressure as well a variable created using factor analysis. In both of these tests, demographic pressure was positive and statistically significant, suggesting that demographic pressure is associated with an increase in the likelihood of inter-state conflict. This result was also robust to the alternate specification of the demographic pressure factor score, which used the 'raw' demographic components to create the factor score. Finally, the impact of demographic pressure was robust to an alternate specification of the dependent variable, the initiation of all MIDs. Demographic pressure was not a significant predictor when assessing the initiations of inter-state wars, but this is likely a function of the small numbers of such initiations (19) and not a function of the unimportance of demographic pressure.

Having established the statistical and substantive importance of demographic pressure in explaining violent dispute initiation, I assessed the four conditional hypotheses to determine what state or dyadic characteristics may affect the impact of demographic pressure. The first of these hypotheses, H6, proposed that wealthy states would be more able than less wealthy states to bear the costs of conflict when experiencing demographic pressure, and would therefore be more likely to initiate external disputes. This hypothesis found support from the empirical tests in Chapter 6. Remembering that wealthy states are less likely to experience demographic pressure, as illustrated in Figure 7.1, those wealthy states that do are more likely to initiate inter-state conflict than are less wealthy states. Appendix F detailed that demographic pressure would need to be above the mean before its impact on violent dispute initiation is statistically

significant, so the support for H6 does not suggest that wealthy states should be expected to begin conflicts with great frequency. In fact, Table 7.3 illustrates that members of the Organization for Economic Cooperation and Development rarely experience demographic pressure to such a degree that it would exert a positive influence on its external conflict behavior.

Table 7.3. Summary of Demographic Pressure and Membership in the OECD

	N	Minimum	Mean	Maximum	Standard Deviation
OECD Members	21,163	1.68	3.26	4.69	0.28
Non-members	31,164	2.91	4.74	6.89	0.76
All countries	52,327	1.68	4.14	6.89	0.95

Table 7.3 shows that most OECD members have demographic pressure scores below the mean of the sample (4.14), and of those, only Turkey initiated inter-state disputes, mostly against Greece, a state with whom they fought many conflicts. On the other hand, 80% of non-OECD observations have demographic pressure scores above the mean value and almost 70% of external initiations were conducted by states above this value. Therefore, while it is an important finding that the impact of demographic pressure is greater for wealthy countries than for less wealthy countries, it is important to keep in mind that this result does not suggest that wealthy states will hasten to start violent inter-state disputes. Rather, in the rare event when wealthy countries experience this phenomenon, their risk of engaging in external conflict is enhanced.

Because external military conflict is costly, I argued in H7 that states would seek to protect trade relations with their important trade partners and therefore, they would decline to attack their trade partners, even when afflicted with demographic pressure. This hypothesis was supported by the empirical evidence. As trade dependence on a partner increases, the impact of demographic pressure decreases.

The final conditional hypothesis linking demographic pressure and inter-state conflict, H8, suggested that anocracies, or mixed regimes, would be the most conflict-prone when experiencing demographic pressure. This result, however, was unsupported. Though unconditionally, anocracies have a higher likelihood of inter-state initiation, this relationship does not affect the impact of demographic pressure. Though the probability of conflict is higher for those states with high levels of demographic pressure, this probability is consistent across regime type. Therefore, democracies are no less likely to initiate an inter-state conflict than an autocracy or anocracy with the same level of demographic pressure. This result does not conform with the expectation for H8; however, it does provide an interesting finding that demographic pressure impacts all regimes in roughly the same manner.

7.1.3 Putting Inter- and Intra-state Conflict Together

The previous two sections summarized the findings of the ten hypotheses linking demographic pressure with inter- and intra-state conflict. In this section, I compare these results across models, especially for those factors that were hypothesized to impact both types of conflict. I proceed cautiously in this endeavor because it is impossible to determine whether a variable that is a significant predictor in both types of conflict has a stronger impact on one conflict compared to the other; however, I will be able to compare whether common variables are significant predictors in both models. Finally, I will assess the final hypothesis of this project which links the two processes together via demographic pressure.

In Table 7.4, I revisit the hypotheses proposed in this dissertation, and those that are bolded are the ones that were supported by the empirical analyses. Three variables were hypothesized to affect both inter- and intra-state conflicts: *demographic pressure*, *state wealth*,

and *level of democracy*.[139] Of these three variables, *demographic pressure* is the only one which was significant in both models in the expected direction. The conditioning impact of state wealth on inter-state conflict was confirmed but not on civil conflict. Finally, the conditional impact of regime type was not found to be significant in either model of conflict. As for those variables that were only expected to condition the impact of demographic pressure in one conflict process, the conditioning effect of trade on inter-state conflict was confirmed, but the conditioning effect of social cleavages on civil conflict was not supported. This is not to say that the variables that did not perform to expectation are not important determinants of their respective conflict processes, but rather that their interaction with demographic pressure did not produce expected results. As will been seen in the final section of this chapter, these non-results suggest important extensions to the current project.

Table 7.4. Comparison of Hypotheses Across Models

Intra-state conflict			Inter-state conflict		
	Variable of Interest	Empirical Expectation		Variable	Empirical Expectation
H1	**Demographic Pressure**	**+**	**H5**	**Demographic Pressure**	**+**
H2	Demographic Pressure * Wealth	-	**H6**	**Demographic Pressure * Wealth**	**+**
			H7	**Demographic Pressure * Trade Dependence**	**-**
H3	Demographic Pressure * Level of Democracy	+/-	H8	Demographic Pressure * Level of Democracy	+/-
H4a	Demographic Pressure * Ethnic Fragmentation	+/-			
H4b	Demographic Pressure * Number of Languages	+			
H4c	Demographic Pressure * Religious Fragmentation	+/-			

[139] *State wealth* and *level of democracy* were expected to condition the impact of demographic pressure. No hypotheses were made regarding their unconditional impact on conflict behavior.

Thus, the demographic pressure result suggests that, of the hypothesized variables, it is the only factor that significantly impacts both inter- and intra-state conflict. If demographic pressure increases the likelihood of both types of conflict, how can one tell whether a state experiencing demographic pressure will experience one type of conflict rather than the other? The methodology employed in this dissertation cannot easily address this choice among options, and it can only suggest, given the conclusions drawn from the tests of the conditional hypotheses, that wealthy countries are more likely to engage in external violence than less wealthy countries. This does not quite answer the question concerning which conflict is more likely to occur, given demographic pressure, especially considering that the state is not the main decision maker in both types of conflict. Because I was unable to answer this question directly through the empirical analysis, I attempted to determine whether a state's action to prevent domestic conflict would be successful in reducing it. Therefore, I proposed one final hypothesis, H9, that a previous inter-state initiation would reduce the likelihood of civil conflict.

The test of H9 supported the notion that a state's external action when experiencing demographic pressure can reduce the likelihood of intra-state conflict. This result is interesting because it is also feasible to believe that external military action would produce one of two negative results for the state: (1) the state could divert scarce resources to an external conflict and leave itself weakened in relation to an internal rival, or (2) failure to acquire resources through an external conflict would not alleviate the domestic grievances that might lead to internal violence. Despite the theoretical possibility of these outcomes, the empirical evidence suggests that previous external violence is associated with a lower probability of civil violence when a state is experiencing demographic pressure. Thus, while demographic pressure is associated with an increased likelihood of both civil and inter-state conflict, the support of H9

suggests that a state that engages in external violence may be able to protect itself from internal violence. This conclusion, however, is disturbing for those who wish to prevent all types of conflict, and it will be discussed in further detail in the next section.

7.2 POLICY IMPLICATIONS

In this section, I will briefly discuss three implications of this project, including warnings against policies toward population control, the general importance of economic development, and the prospect of external conflict as a means of preventing internal conflict. There are further policy implications that could be drawn from this analysis, especially regarding the strengthening of domestic institutions and improving the access to international funding during times of crisis; however, I will focus on the three areas to which this project can most directly speak.

First, the main finding of this project is that demographic pressure within a state is associated with an increased likelihood of both external and internal conflict. This may suggest that to prevent violent conflict, states should enact policies to limit the fertility or reproduction of their populations. Some states, notably China with its One Child policy, have attempted to do exactly this. Government regulation of fertility is probably not the best option, however. Not only would such a policy be difficult to enforce universally, the unintended consequences of such regulation may be worse than the initial problem. Continuing with the China example, enforcement of this policy has been more easily achieved in urban areas and many exceptions have been made for rural families. Still, as the policy has been more tightly enforced, Chinese

citizens have engaged in more violent means to protest the policy.[140] Additionally, though the birth rate in China has dropped since the introduction of the One Child policy, the Chinese must now worry about whether there will enough people to support the elderly as the population ages.[141]

> China says that its population control measures have resulted in some 300m fewer births in the last 30 years. But while such measures may have helped to ease pressure on scarce resources and reduce once widespread poverty, they are also aggravating demographic imbalances that could undermine these gains. In the next decade, the proportion of China's population aged 65 and over will begin swelling rapidly while the growth of the working age population will shrink. China's rate of ageing will be faster than that of any other country in history. If current trends continue, the ratio of working age people to retirees will fall from six today to two in 2040. That will impose colossal financial burdens in a country already struggling to meet its pension commitments to the elderly. In urban China, what is referred to as the "4-2-1 phenomenon" looms on the horizon: four grandparents and two only-child parents being supported by one only child.[142]

Finally, a cultural preference for sons instead of daughters has led to the selective abortion of large numbers of unborn girls, a practice that has led to a stark difference in the sex ratio among young children. This skewed ratio is expected to lead to a large proportion of young bachelors, a group that is associated with domestic conflict.[143]

Instead of adopting regulation to limit fertility, a second implication of this project points to the importance of economic development for a decrease in demographic pressure. Increase in a state's wealth can reduce demographic pressure through two channels. The first is that increasing wealth is associated with the demographic transition, a process by which population growth rates decline with rising prosperity.[144] Second, rising prosperity, especially when it is aggregated across the country, increases the state's ability to adapt to any fluctuations in the

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[140] "One-child policy sparks more rioting in Guangxi; Anger against birth control fines spreads across region," *South China Morning Post*, 31 May 2007.
[141] See Figure 3.4 for the projected age structure of China in 2050.
[142] "A brother for her," *The Economist* (US edition), 18 December 2004.
[143] "6.3 brides for seven brothers," *The Economist* (US Xmas edition), 19 December 1998.
[144] The literature on demographic transition is extensive. For a taste of this literature, see Kirk (1996); Galor and Weil (2000); and Lee (2003).

nation's population. This adaptive capacity is instrumental in determining whether or not a state's demographic profile is sustainable or not. For these reasons, economic development can reduce demographic pressure through two avenues without having to resort to coercive or objectionable government policy.[145]

Finally, the third implication of this project addresses the finding that a previous inter-state conflict may be associated with a lower incidence of civil conflict when a state is experiencing demographic pressure. This finding should be taken with some caution, and should not be used as a justification for a state's expansionist tendencies. Instead, it is important to recognize that governments experiencing demographic pressure may prefer peaceful ways to address domestic grievances, but are limited, especially in the developing world, by inefficient state institutions. Strengthening domestic institutions may allow governments to respond to societal demands without resorting to external military conflict.

7.3 FUTURE PROJECT EXTENSIONS

The final section of this project addresses possible extensions to the arguments and tests performed here. Because several of the conditional hypotheses were unsupported by the empirical evidence, this project has introduced new puzzles to consider. I will briefly discuss two of them here, one springing from the regime type non-result and the other from the lack of support for the social cleavage hypotheses. A third future project springs from Starr's (1994) suggestion that 'revolution' may cause a state to be a ripe target for aggression by another state.

[145] Some claim that economic development has yet to fix an imbalanced sex ratio, especially in South Korea and Taiwan. See "Missing persons," *The Economist* (US edition), 24 February 2001. However, despite this continued imbalance, birth rates have declined in these countries.

In this project, I proposed that regimes that possessed characteristics of both democracies and autocracies would have a higher likelihood of inter- and intra-state conflict because they allow limited political mobilization in the form of opposition parties, but they rely on too large of the population to remain in power to engage in effective suppression. Therefore, grievances among societal groups could lead to mobilization against the government, and the government would be unable to suppress their dissent. If the demographic pressure prevented the government from meeting the demands of these disaffected groups, then the mobilized groups might threaten the stability of the government. Therefore, demographic pressure was expected to have a stronger impact on the conflict behavior of anocracies than other types of regimes. While this result was weakly supported for civil conflict at the highest levels of demographic pressure, generally, demographic pressure affected all regime types in approximately the same manner. This result was especially surprising for the inter-state models because of the relatively consistent findings of the democratization and conflict literature.

The case of the 2005 French riots suggests another possible outlet when states experience demographic pressure. This example illustrates that demographic concerns can affect advanced industrial democracies as well as underdeveloped countries; however, the death toll of the French riots was not large, and unlikely to surpass the 25 death threshold for the conflict to enter the dataset used in this project.[146] Perhaps, then, in countries where mobilization is possible, including democracies and most anocracies, domestic protest occurs at an even lower level of violence than captured in this study. Riots may result in a large amount of property damage, as was the case in the French example, and demonstrations may contribute to the radicalization of the population, but they do not typically result in a large number of deaths. Additionally, coups

[146] Remember, too, that the dataset utilized here ended in 1999, so even if this threshold had been surpassed, this case would still not be in my dataset due to the time period under investigation.

are a frequent way in which executive change occurs in autocratic regimes, events which also do not typically result in a large number of deaths. Therefore, the odd result of the impact of demographic pressure conditioned on level of democracy may be clarified by looking at political violence or political activity that does not lead to a large number of deaths. In addition to shedding light on the occurrence of civil violence, this extension could speak to the motivations for inter-state conflict. If a government faced non-lethal violence at home, its incentive to engage in lethal violence abroad might be diminished. As this project dealt specifically with violent or lethal conflict, it was not appropriate to account for these non-violent acts of protest; however, these types of acts may also lead to instability within a country and are worth investigating.

The French case also highlights the need for a second, larger extension of this project. Though the situation in the *banlieues* outside of Paris and other large cities were quite dire, these problems did not generally affect the vast majority of the population. Grievances were concentrated among a minority group within France, recent African immigrants. It is surprising that the social cleavage hypotheses were not supported in the civil conflict models, though unconditionally, each of the social cleavage measures conformed to expectations: ethnic and religious fractionalization exhibited non-linear relationships with civil conflict and the number of languages within a country was associated with an increased likelihood of civil conflict. The interaction of social cleavages and demographic pressure, however, did not conform to expectations. This result may be explained, however, by *differential growth*, or what I will call *differential demographic pressure*. Toft (2002) discusses that ethnic groups in multinational states do not necessarily have the same population growth rate, and over time, this difference may lead to a shift in the demographic balance among competing ethnic groups. She highlights

the radically different growth rates among Jewish Israelis, Arab Israelis, and Palestinian Arabs. This is also complicated by the difference in growth rates among secular Jews and Ultra-Orthodox Jews. Toft (2002) argues that as Ultra-Orthodox Jews and Arab Israelis grow at faster rates than secular Jews, the shifting representation in the Knesset may seriously affect Israeli domestic and foreign policy.

Growth rates are not the only demographic factors than can change differently within a society. If poor immigrants and ethnic groups are concentrated into cities in the developed world, then differential urbanization may account for urban violence not experienced throughout the rest of the country. If ethnic or religious groups are expanding in comparison to rival groups, how densely populated the country is can affect communal violence over territory. Thus, if demographic pressure affects the ethnic, linguistic or religious groups within a country differently, the grievances of society may be concentrated in particular groups and not widely experienced throughout society. The measure of demographic pressure used in this study cannot capture this dynamic, as it looks at the 'raw' demographic factors for the entire country, not each group with the country; however, such a measure that could account for group-level dynamics would improve upon our understanding about how demographic pressure affects the group dynamics within a country. As much of the research conducted on differential demographic factors assesses individual countries and conflict (DeVotta 2002, Randall 2005, Slack and Doyon 2001, Toft 2002), there is a gap in the literature on this topic.

Related to the notion of differential growth is a measurement problem with the social cleavage variables, especially the fractionalization variables. For the most part, these variables are time-invariant because they were measured by the Soviets in the mid-1960s, but never

updated.[147] Therefore, though differential growth may have led to a change in fractionalization of a country, these changes are not reflected in these measures. Though these changes may accumulate slowly within a country, it is not reasonable to assume that in places like Lebanon, Israel or India, the ethnic or religious makeup of the country is the same today as it was in 1964. Indeed, the Lebanese government is so sure that the religious composition of the country has changed dramatically that it hasn't conducted a census since 1934 in fear that the Christian population is so depleted now in comparison to the other religious groups that the entire political settlement of shared power among the different religions, confessionalism, could be overthrown and the country could experience a repeat of its deadly civil war.[148] As these measures of fractionalization are common in many studies of civil conflict, the re-coding of these variables could upend empirical results based on these flawed measures; however, properly measuring concepts is an integral part of the scientific process.

Finally, in his discussion of the link between 'war' and 'revolution', Starr (1994) discussed the possibility that internal conflict, or revolution, could make a state a promising target of an inter-state military action. In this project, I have assessed the incentives that a state experiencing demographic pressure may have to initiate external conflicts; however, it is also possible that such as state may be a target of another state's external aggression. The example of the 1969 Soccer War suggests that there may be some validity to this proposition. Both El Salvador and Honduras had high demographic pressure scores, and while El Salvador was the aggressor in this war, some could argue that Honduras prompted the fighting by attempting to expel approximately 300,000 Salvadorans (Durham 1979). Therefore, it is reasonable to suggest that the demographic pressure in Honduras provided an additional incentive for El Salvador to

[147] Only the breakup of Yugoslavia and the Soviet Union prevent this variable from being perfectly time-invariant.
[148] "Census sensitivity; Counting people," *The Economist* (US edition), 22 December 2007.

attack. As many regions include multiple states with demographic pressure, it is possible that states choose the target that is the weakest, and demographic pressure is expected to contribute to that weakness.

These three extensions could not be accommodated within the confines of this project; however, they provide exciting avenues to pursue in future research to help increase our understanding of the impact of demographic pressure on inter- and intra-state conflict. Until these extensions can be evaluated, the current project has increased our knowledge about the effects of demographic pressure and the conditions under which it is associated with both inter- and intra-state conflict.

APPENDIX A

ASSESSING SOCIAL CLEAVAGE VARIABLES

In Fearon and Laitin's (2003) oft-cited paper on the empirical causes of civil war, three measures that capture characteristics about the culture of a country are identified: ethnic fractionalization (EF), number of languages, and religious fractionalization (RF). Fearon and Laitin (2003) include all three of these measures in their analysis and find that they are insignificant predictors of the onset of civil war. In Chapter 5, I chose not to include all three measures in the same model because some are moderately correlated, as illustrated in Table A.1 and because it is possible that their effects on civil conflict are not linear. As shown in the various models in Table 5.10, the two fractionalization variables (EF and RF) exhibit non-linear relationships with civil conflict. To include two EF measures, two RF measure and a language measure would have added a layer of complexity to the models that was unnecessary, given that social cleavages are not my main concepts of interest. This appendix, therefore, presents the results if I had included each measure individually as well as including all three of them together in the same model.

In Table A.2 I present five models: Model A.1 includes all three social cleavage variables, Model A.2 includes only *ethnic fractionalization*, Model A.3 has only the *number of*

languages, Model A.4 has only *religious fractionalization*, and Model A.5 includes all three social cleavage variables plus *demographic pressure*. In Model A.1 in which all three social cleavage variables are included, only the number of languages is significant, while the two fractionalization measures are insignificant. In Model A.5, where demographic pressure was added, number of languages and religious fractionalization are positive and statistically significant. Ethnic fractionalization in both models has a negative sign, which is contrary to expectations. However, when each social cleavage measure is included in a model separately (A.2-A.4), all have positive signs, and both ethnic fractionalization and number of languages is statistically significant. Religious fractionalization is significant at the 0.10 level, though not at the conventional 0.05 level. These results suggest that there is some amount of multicollinearity among these variables, and they are better suited to be assessed separately than being placed in the same model to avoid the possibility of faulty inference.

Table A. 1. Correlations Among the Social Cleavage Variables

	Ethnic Fractionalization	Number of Languages	Religious Fractionalization
Ethnic Fractionalization	1.00		
Number of Languages	0.65	1.00	
Religious Fractionalization	0.39	0.37	1.00

Table A. 2. Assessing Social Cleavage Variables

	Model A.1	Model A.2	Model A.3	Model A.4	Model A.5
Constant	-10.89* (1.62)	-9.03* (1.42)	-10.49* (1.60)	-8.94* (1.41)	-20.14* (2.80)
Ethnic Fractionalization	**-0.03** **(0.36)**	**0.83*** **(0.30)**			**-0.18** **(0.36)**
Number of Languages	**0.04*** **(0.01)**		**0.04*** **(0.01)**		**0.04*** **(0.01)**
Religious Fractionalization	**0.30** **(0.38)**			**0.64** **(0.35)**	**0.18** **(0.38)**
Population (logged)	0.51* (0.07)	0.48* (0.07)	0.50* (0.07)	0.51* (0.07)	0.46* (0.07)
Level of Democracy	0.20* (0.05)	0.17* (0.05)	0.19* (0.05)	0.18* (0.05)	0.22* (0.05)
Level of Democracy (squared)	-0.01* (0.002)	-0.01* (0.002)	-0.01* (0.002)	-0.01* (0.002)	-0.01* (0.003)
Capabilities	-41.50* (8.68)	-28.42* (6.34)	-40.89* (8.58)	-30.48* (6.11)	-31.52* (7.20)
Total Trade$_{t-1}$	-2.58* (0.62)	-2.13* (0.59)	-2.45* (0.61)	-2.12* (0.59)	-2.53* (0.64)
Economic Growth	-0.0002 (0.01)	0.003 (0.01)	-0.001 (0.01)	0.003 (0.01)	-0.01 (0.02)
Time Since Last Conflict	-1.82* (0.12)	-1.85* (0.12)	-1.82* (0.12)	-1.85* (0.12)	-1.75* (0.12)
State Wealth$_{t-1}$	0.40* (0.12)	0.21* (0.10)	0.38* (0.12)	0.16 (0.10)	1.12* (0.20)
Demographic Pressure (Factor)					0.89* (0.22)
N	4054	4054	4054	4054	3978
Chi-square	934.95*	968.48*	918.27*	968.33*	919.89*
Pseudo R^2	0.5703	0.5669	0.5701	0.5658	0.5657

Dependent variable is *Civil Conflict*. Cell entries are logistic estimates with standard in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

APPENDIX B

ASSESSING *CIVIL WAR* AS A DEPENDENT VARIABLE

This appendix seeks to address the possibility that the results presented in Chapter 5 are a function of assessing all lethal civil conflicts with 25 or more battle deaths and not just civil wars, as is the norm in many studies of civil conflict. *Civil Conflict* is coded "1" if 25 or more battle deaths were recorded for that year and "0" otherwise. *Civil War*, on the other hand, is coded "1" if there is sustained and reciprocated violence between the state and an internal group within the state in which battle deaths meet or exceed 1,000, and "0" otherwise.[149] In this appendix, I draw civil war variables from two different data sources: Correlates of War (COW)[150] and the Peace Research Institute of Oslo (PRIO). In Table B.1 I present the correlations among the three dependent variables, in Table B.2 I offer descriptive statistics for the civil conflict measure as well as the two measures of civil war, and in Table B.3 I re-report the results of H1 (Model 5.9) and present this model with the two new dependent variables.

[149] See Sambanis (2004) for a discussion of civil war codings from different data sources.
[150] Sambanis (2004) creates his own coding for civil wars, but he compares his measure with existing measures. The 2000 coding from COW was therefore extracted from his dataset.

Table B. 1. Correlations Among the Three Dependent Variables

	Civil Conflict	Civil War (COW)	Civil War (PRIO)
Civil Conflict	1.00		
Civil War (COW)	0.48	1.00	
Civil War (PRIO)	0.49	0.57	1.00

Table B. 2. Descriptive Statistics of Civil War Variables

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Civil Conflict	3978	0.15	0.35	0	1
Civil War (COW)	3701	0.07	0.26	0	1
Civil War (PRIO)	3978	0.04	0.19	0	1

The first column of Table B.3 replicates Model 5.9 from Table 5.6. In the second column, the original *civil conflict* dependent variable is replaced with the *civil war* variable from Sambanis (2004) based on the COW codings. There are fewer observations due to missing data on the dependent variable in this model. *Demographic pressure* in Model B.1 retains its statistical significance and its positive sign, suggesting that demographic pressure is also a significant predictor of higher intensity civil conflicts when considered separately; lower-level conflicts are not driving the result for this variable. Most of the control variables retain the sign and significance that they had in Model 5.9, with a few exceptions, including the lack of significance of the ethnic fractionalization variables. The lack of findings for these measures is consistent with the previous studies that found that ethnic fractionalization is not a significant predictor of civil wars.[151] These slight differences in the models, however, do not detract from the robustness of the demographic pressure variable.

In Model B.2 the dependent variable is again changed; in this instance, it is the civil war variable from the PRIO conflict dataset. This coding is slightly different from the COW coding,

[151] See Fearon and Laitin (2003) as an example.

which may explain the low correlation between the two measures of civil war. The PRIO variable is coded "1" if violence resulted in at least 1,000 battle deaths *in a given year*, rather than the 25 battle death threshold of the *civil conflict* dependent variable utilized in the main tests of this chapter (Gleditsch et al. 2002). Comparing Model B.2 to the original model, it is clear that the demographic pressure variable remains positive and statistically significant, reinforcing that the strong conclusions drawn regarding demographic pressure in the main text of Chapter 5 were not a function of the magnitude of violence in the countries. Demographic pressure increases the likelihood not only of lower-level fatal violence within a country, but it also increases the likelihood of large-scale civil war. As in the previous model, a few of the control variables do lose their significance, including the two ethnic fractionalization variables. Additionally, the military capabilities variable is not significant at the traditional 0.05 level in this model. The coefficients of all three of these variables retain their sign, however, which suggests that their general relationship with violent conflict is not fundamentally changed by the changed coding of the dependent variable. Finally, unique to this model, the economic growth measure achieves statistical significance. Though this result is not robust across model specifications, that economic growth may deter higher-level conflicts is encouraging, even if it is less capable of reducing the likelihood of conflicts at lower levels of fatal violence.

These models show that the positive, statistically significant impact of demographic pressure is not a function of how the dependent variable is specified; demographic pressure is positively associated with fatal civil conflict when assessing all conflicts or just civil wars. The use of a lower-intensity measure of civil conflict was utilized in this chapter due to the assumption that states are interested in preventing all forms of violent conflict, not just those that result in enough deaths to be classified a civil war. The results of this appendix indicate that this

variable choice does not affect the conclusions about the importance of demographic pressure is such violent conflict.

Table B. 3. Impact of Demographic Pressure on Civil War Occurrence

	Model 5.9	Model B.1	Model B.2
	PRIO Civil Conflict	COW	PRIO
Constant	-18.86* (2.72)	-16.97* (3.55)	-27.15* (4.69)
Population (logged)	0.47* (0.06)	0.40* (0.09)	0.53* (0.09)
Capabilities	-20.48* (4.52)	-15.20* (7.73)	-14.49 (7.94)
Economic Growth	-0.01 (0.01)	-0.01 (0.02)	-0.05* (0.02)
Time Since Last Conflict	-1.78* (0.12)	-1.37* (0.16)	-1.31* (0.17)
State Wealth$_{t-1}$	0.86* (0.19)	0.83* (0.28)	1.30* (0.32)
Total Trade$_{t-1}$	-1.89* (0.60)	-2.19* (1.10)	-2.44* (0.96)
Level of Democracy	0.17* (0.05)	0.17* (0.08)	0.35* (0.08)
Level of Democracy (squared)	-0.007* (0.003)	-0.01* (0.004)	-0.02* (0.004)
Ethnic Fractionalization	3.24* (1.13)	0.90 (1.70)	2.11 (1.76)
Ethnic Fractionalization (squared)	-2.62* (1.16)	-0.66 (1.78)	-2.05 (1.77)
Demographic Pressure (Factor)	**0.92* (0.22)**	**0.97* (0.29)**	**1.51* (0.40)**
N	3978	3701	3978
Chi-square	951.95*	584.69*	440.52*
Pseudo R^2	0.5634	0.6086	0.5234

Dependent variable is listed in the second row of the table. Cell entries are logistic estimates with robust standard errors in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

APPENDIX C

ALTERNATIVE SPECIFICATIONS OF THE INTER-STATE INITIATION

In this Appendix, I attempt to demonstrate that the positive, statistically significant impact of *demographic pressure* on inter-state conflict is robust to alternative specifications of the dependent variable. In Model C.1, I replaced *violent inter-state dispute initiation* with the initiation of any level of militarized inter-state dispute (MID), include threats, displays, or uses of force, or war. While there are many more general MID initiations than violent MID initiations (only uses of force or war), this remains a rare event. Only 1.17% of observations in this sample experienced a MID initiation. I argue in this project that states engage in external military violence in order to acquire resources to assuage the grievances of their internal populations, and I contend that violent military action is required to achieve those ends. However, such violent initiations are included in *all MIDs*, and thus, I expect demographic pressure to remain positive and statistically significant, though it may be attenuated by the inclusion of lower-level MIDs that are not expected to be influenced by a state's level of demographic pressure. The results in Model C.1 confirm this expectation.

In Model C.2, I assess only the initiations of wars, those conflicts between two states that result in at least 1,000 battle deaths. Only *Affinity, contiguity, joint non-democracy,* and *civil*

conflict in the target are significant in this model. It is not surprising that more variables, including *demographic pressure* do not achieve statistical significance, given that there are only 19 observations (out of more than 52,000) in which a war was initiated. The lack of information that pervades this model makes it difficult to find statistical support for many variables which are expected to impact the likelihood of inter-state conflict.

Though the dependent variable utilized in the main text of Chapter 6 was chosen because of its match with the theoretical argument forwarded in this project, it is reassuring that the impact of demographic pressure is robust to some alternate specifications.

Table C. 1. Alternate Specifications of Inter-state Dependent Variable

	Model C.1	Model C.2
	DV=All MID initiations	DV=War initiations
Constant	-9.60* (1.82)	-17.32 (11.49)
Affinity	-0.80* (0.23)	-2.47* (0.50)
Contiguity	1.90* (0.18)	2.48* (0.58)
Joint Alliance	0.36* (0.14)	0.12 (0.53)
Joint Democracy	-0.88* (0.22)	-0.59 (1.02)
Joint Non-democracy	-0.38* (0.14)	-1.70* (0.70)
Democracy$_i$-Non-democracy	-0.49* (0.16)	-0.44 (0.62)
Civil Conflict$_j$	0.61* (0.11)	1.43* (0.41)
Relative Capabilities$_i$	0.91* (0.18)	0.20 (0.85)
Trade Dependence$_{ij,t-1}$	2.01 (2.81)	-136.32 (125.63)
Total Trade$_{i,t-1}$	-1.16* (0.40)	-0.23 (1.40)
Economic Growth$_i$	-0.04* (0.01)	-0.04 (0.07)
Time since last initiation$_i$	-0.38* (0.04)	-0.19 (0.17)
State Wealth$_{i,t-1}$	0.46* (0.14)	0.73 (0.72)
Demographic Pressure$_i$	**0.56*** **(0.17)**	**1.23** **(1.11)**
N	52,327	52,327
Chi-square	972.31*	820.81*
Pseudo R^2	0.1867	0.2118

Dependent variable is noted for each model. Cell entries are logistic estimates with robust standard errors clustered on dyad in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

APPENDIX D

ALTERNATE MEASURE OF DEMOGRAPHIC PRESSURE

In Model D.1, I employ a second measure of *demographic pressure* created using factor analysis. This measure used the 'raw' demographic factors before they were divided by *state wealth*,[152] and though this measure was highly correlated with the measure used in the main text of Chapter 6, I present Table D.1 to illustrate that the consistently significant impact of *demographic pressure* is not a function of the construction of the independent variable. As Model D.1 indicates, the significance of both *state wealth* and *demographic pressure* are impervious to the new specification of *demographic pressure*. Thus, I feel confident that the results in the text of Chapter 6 are not a function of variable construction.

[152] See Chapter 4 for an extended description of the construction of this variable.

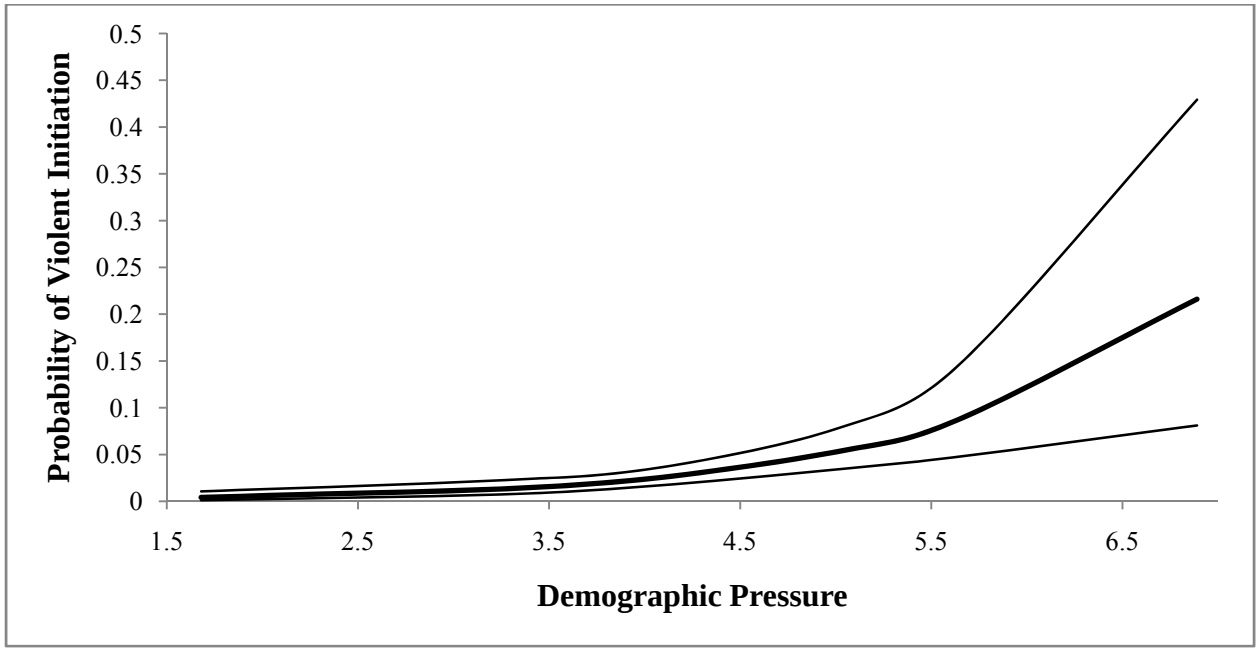
Table D. 1. Impact of Alternate Demographic Pressure Measure on Violent Inter-state Conflict

	Model D.1 (Compare to Model 6.9)
Constant	-11.15* (1.61)
Affinity	-1.10* (0.24)
Contiguity	2.14* (0.24)
Joint Alliance	0.26 (0.16)
Joint Democracy	-0.61* (0.23)
Joint Non-democracy	-0.41* (0.16)
Democracy$_i$-Non-democracy	-0.37 (0.20)
Civil Conflict$_j$	0.66* (0.14)
Relative Capabilities$_i$	1.04* (0.21)
Trade Dependence$_{ij,t-1}$	4.02 (2.58)
Total Trade$_{i,t-1}$	-1.16* (0.48)
Economic Growth$_i$	-0.05* (0.01)
Time since last initiation$_i$	-0.42* (0.05)
State Wealth$_{i,t-1}$	0.37* (0.12)
Demographic Pressure (Score)	**0.79*** **(0.14)**
N	52,327
Chi-square	820.19*
Pseudo R^2	0.1937

Dependent variable is *Violent Initiation*. Cell entries are logistic estimates with robust standard errors clustered on dyad in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

APPENDIX E

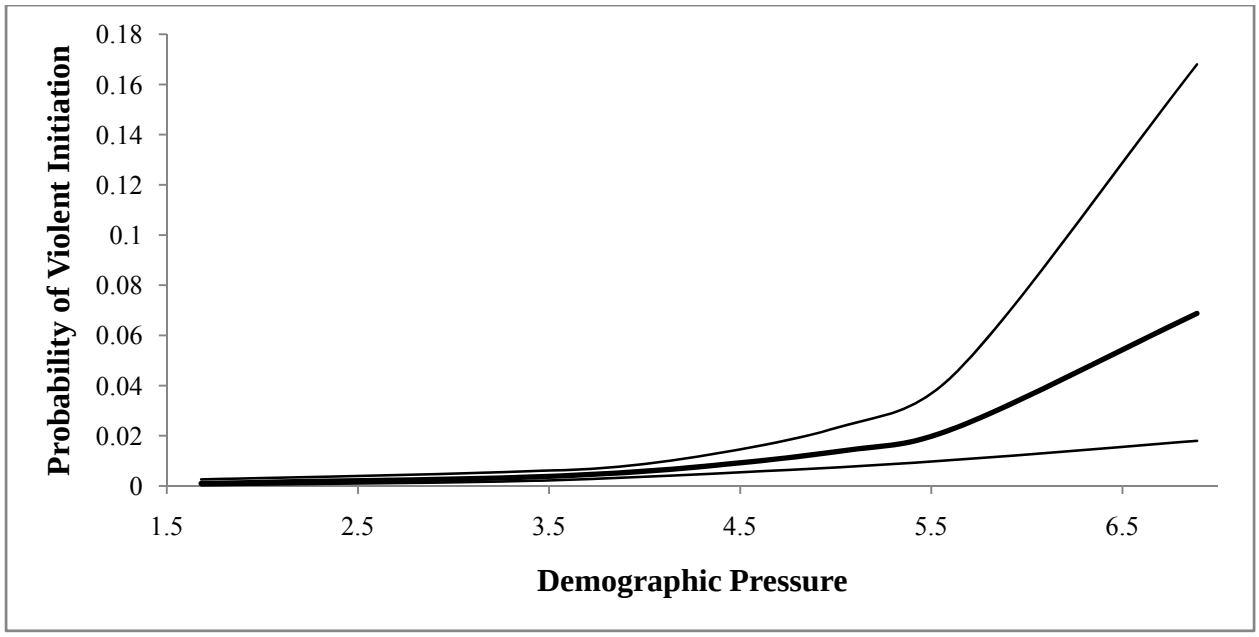
ALTERNATE PREDICTED PROBABILITY RESULTS (MODEL 6.9)



All continuous variables set at mean values; *Contiguity*=1, *Joint Alliance*=0, ***Civil War in Target*=1**, regime dummies all equal zero, therefore, results capture scenario of non-democracy versus democracy, the excluded category.

Figure E. 1. Probability of Violent Inter-state Dispute Initiation with Civil Conflict in Target (Non-democracy versus Democracy)

In the specification represented in Figure E.1, there is a civil conflict in the target. Note the difference in the scale of the vertical axis from that in Figure 6.1. The probability of violent inter-state dispute initiation is higher when there is a civil conflict in the target than when such conflict is absent.

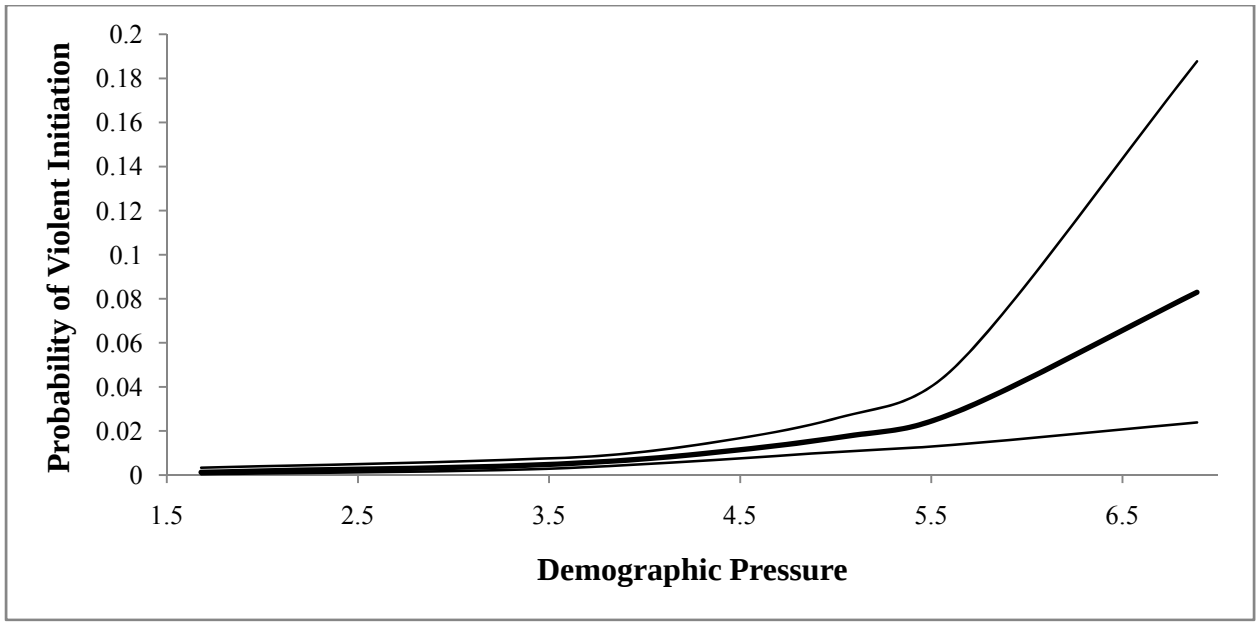


All continuous variables set at mean values; *Contiguity*=1, *Joint Alliance*=0, *Civil War in Target*=0, ***Joint Democracy*=1**, therefore, results capture scenario of democracy versus democracy.

Figure E. 2. Predicted Probability of Violent Inter-state Dispute Initiation (Democracy versus Democracy)

The joint democracy dummy variable is 'turned on' in Figure E.2, indicating that the predicted probabilities illustrated in this figure refer to democracies versus other democracies. The probabilities are considerably lower than those in Figure 6.1, which is consistent with the democratic peace literature that has found that democracies do not engage in wars with other democracies.

In Figure E.3, the democracy/non-democracy dummy is 'turned on', meaning that the probabilities presented here represent democratic challengers versus non-democratic targets. While this figure does not vary much from Figure E.2, it is different than Figure 6.1 because of the significance of the democracy/non-democracy variable, indicating that there is a significant difference between the violent inter-state dispute initiation behavior of non-democracies versus democracies and democracies versus non-democracies.



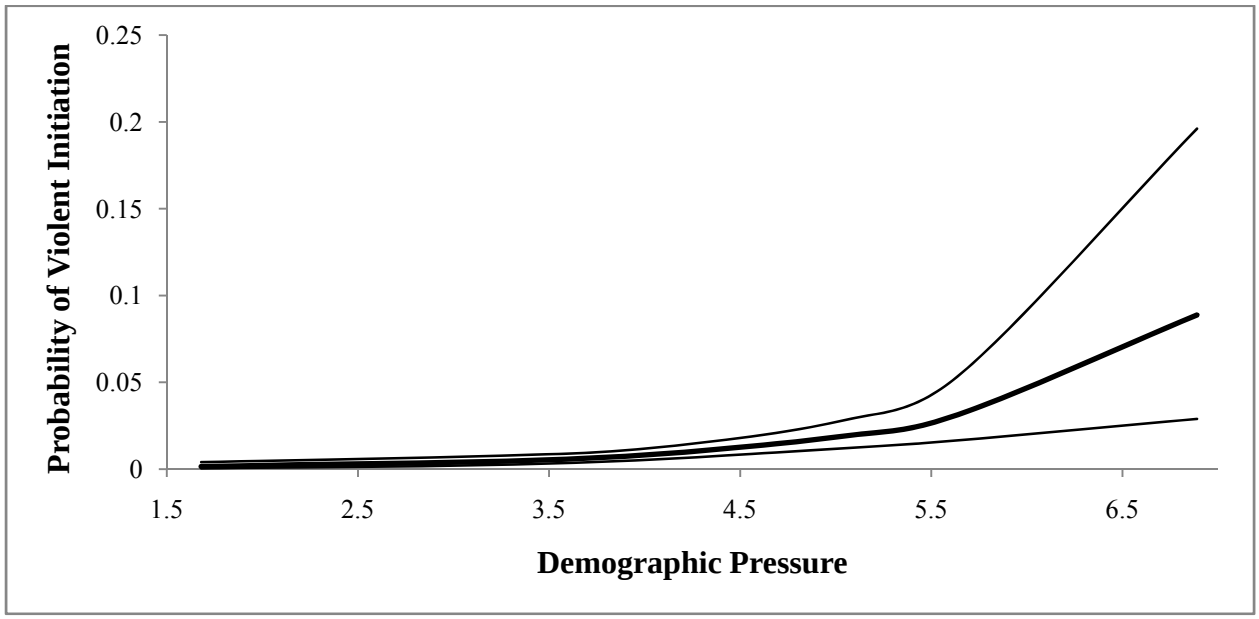
All continuous variables set at mean values; *Contiguity*=1, *Joint Alliance*=0, *Civil War in Target*=0, ***Democracy-Non-democracy*=1**, therefore, results capture scenario of democracy versus non-democracy.

Figure E. 3. Predicted Probability of Violent Inter-state Dispute Initiation (Democracy versus Non-democracy)

In Figure E.4, the joint non-democracy dummy is 'turned on', meaning that these results indicate the probabilities of violent inter-state dispute initiation by a non-democracy against another non-democracy. Because the coefficient of the joint autocracy variable insignificant, it is not surprising that the scale of the Y-axis of this figure is not different than the scale in Figure 6.1.

Finally, Figure E.5 presents the predicted probability of violent inter-state dispute initiation for all five specifications presented in Figure 6.1 and Figures E.1-E.4. The line with the 'star' marker is the predicted probability line found in Figure 6.1. Assessing the same challenger-target combination (non-democracies versus democracies), it is clear that a civil conflict in the target dramatically increases the likelihood of inter-state conflict. Below the non-democracy/democracy line are the other combinations of regime types assessed in this appendix. While these lines are not much different *from each other*, the distance between these three lines

and the non-democracy/democracy line provides graphical evidence that these combinations are less conflict prone than non-democracies versus democracies. It is interesting to note that the joint democracy dummy is visibly lower than the other two regime combinations (democracy/non-democracy and joint non-democracy). However, when the joint democracy dummy variable is the excluded variable in Model 6.9, only the non-democracy/democracy dummy is significant. This indicates that the probability of a democracy initiating an inter-state conflict against another democracy is *not* significantly less likely than a non-democracy against another non-democracy, or a democracy against a non-democracy.



All continuous variables set at mean values; *Contiguity*=1, *Joint Alliance*=0, *Civil War in Target*=0, ***Joint Non-democracy*=1**, therefore, results capture scenario of non-democracy versus non-democracy.

Figure E. 4. Predicted Probability of Violent Inter-state Dispute Initiation (Non-democracy versus Non-democracy)

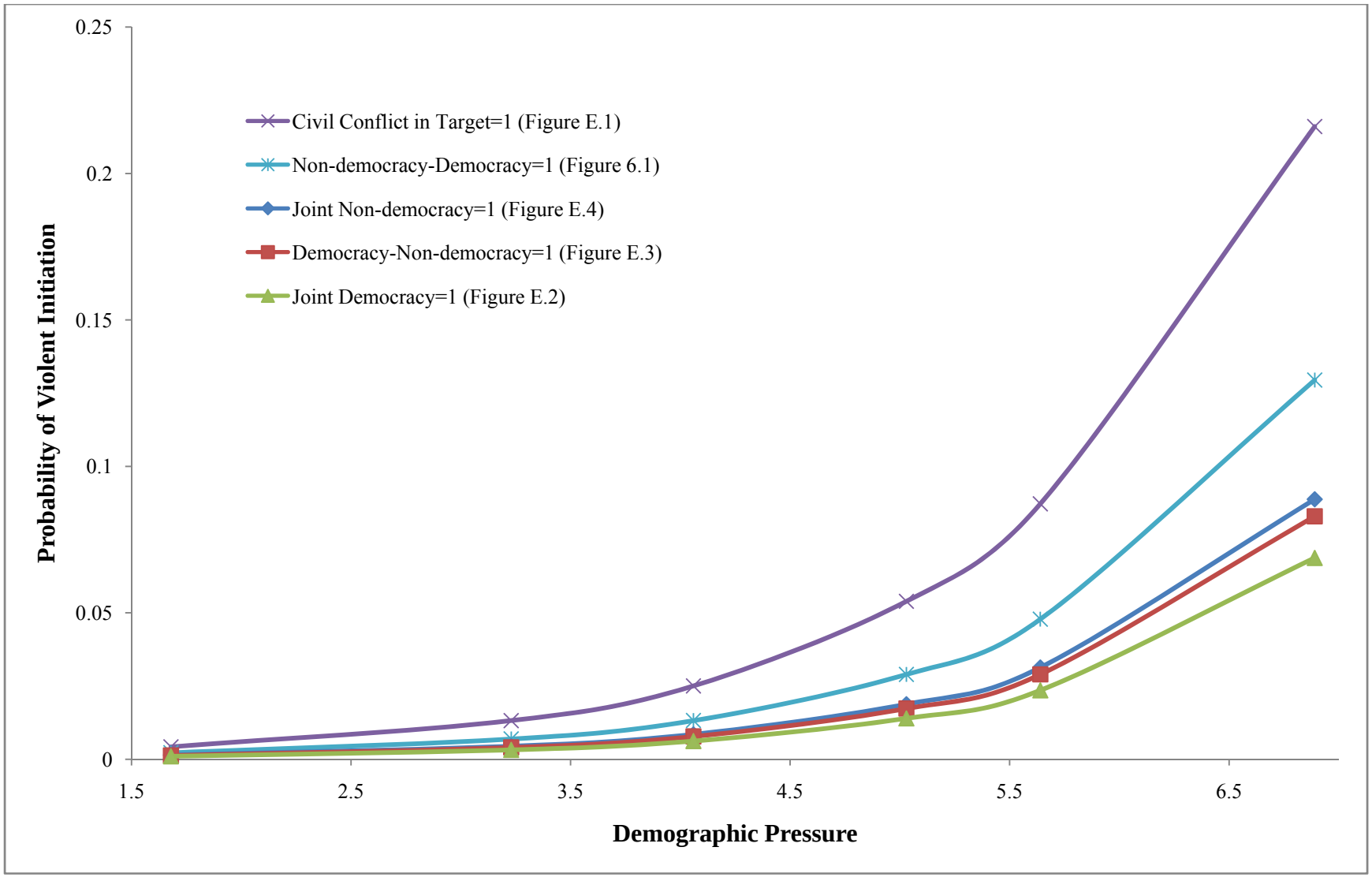


Figure E. 5. Comparing Various Probabilities for Violent Inter-state Dispute

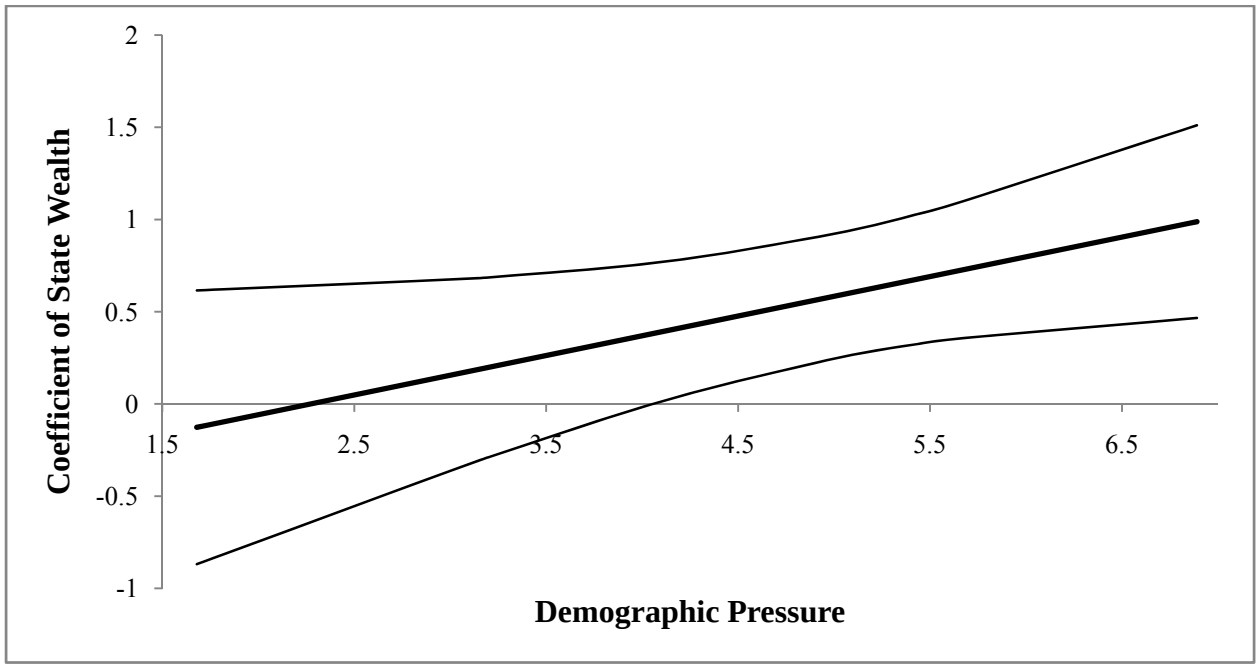
APPENDIX F

ASSESSING THE IMPACT OF WEALTH, CONDITIONED ON DEMOGRAPHIC PRESSURE

Throughout this chapter I have assessed the impact of demographic pressure on violent inter-state dispute initiation, conditioned on several other factors. The result that high state wealth might lead such states to initiate violent disputes may concern readers, especially considering that one of the conclusions of this study is that economic development is a key element of reducing demographic pressure and its detrimental effects. Therefore, I present Appendix F with the intention of clarifying the role that state wealth plays in violent inter-state dispute intitiation.

Figure F.1 illustrates the impact of state wealth on violent inter-state dispute intitiation, conditioned on the level of demographic pressure. Remembering that the individual components of demographic pressure were weighted by state wealth before they were combined in a single measure, the impact of wealth is slightly more complicated than it may seem at first glance. As this figure shows, the impact of wealth on inter-state conflict is not statistically significant until demographic pressure is approximately 4.0 (which is slightly below the mean value of the sample (4.14)). However, high state wealth makes it less likely for states to have high levels of demographic pressure in the first place. Thus, wealthy states must have higher levels of

demographic pressure than their less wealthy brethren to experience demographic pressure, and if such pressure surpasses the 4.0 threshold, *only then* does wealth exert a statistically significant positive impact on the likelihood of violent inter-state dispute initiation.



Note: Confidence intervals set at 95%.

Figure F. 1. Impact of State Wealth on Violent Dispute Initiation, Conditioned on Demographic Pressure

APPENDIX G

ALTERNATE SPECIFICATION OF *LEVEL OF DEMOCRACY* MODELS

Appendix G presents an alternate specification of Models 6.12 and 6.13 with the exclusion of the regime dummy variables. The exclusion of these variables does not visibly alter the results of the previous models, though a likelihood ratio test comparing the models with and without the regime dummy variables indicated that the regime dummies, despite their lack of individual statistical significance in this appendix, are statistically significant in the model, *as a group*. The removal of the regime dummies, along with their corresponding potential multicollinearity, does not significantly affect conclusions drawn regarding the conditional impact of the level of democracy; however, it does lead to the loss of information about the regime (dis)similarity between the challenger and target.

Figure G.1, which graphically presents the impact of demographic pressure conditioned on the level of democracy, does show slight differences when compared to Figure 6.4. Though the shape of the effect is similar, in Figure G.1, the impact of demographic pressure is insignificant for many autocracies (those states with *level of democracy* scores between 0 and 5), a result not seen in Figure 6.4. The continued insignificance of the interactions in Model 6.2

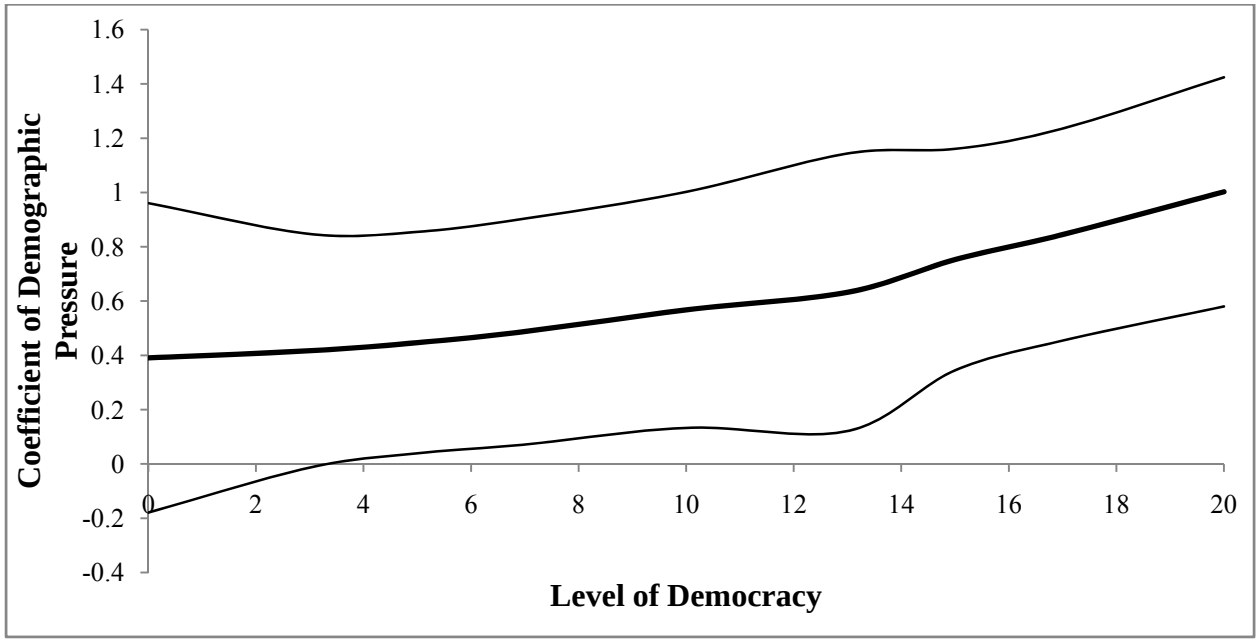
suggest that this difference between the two figures sheds little light on the relationship between demographic pressure and inter-state conflict, conditioned on level of democracy.

Table G. 1. Alternate Specification of *Levels of Democracy* Models

	Model G.1 (Compare to Model 6.12)	Model G.2 (Compare to Model 6.13)
Constant	-10.94* (2.16)	-9.60* (2.36)
Affinity	-1.16* (0.23)	-1.22* (0.23)
Contiguity	2.19* (0.22)	2.12* (0.22)
Joint Alliance	0.24 (0.16)	0.23 (0.16)
Civil Conflict$_j$	0.65* (0.14)	0.64* (0.14)
Relative Capabilities$_i$	0.75* (0.20)	0.81* (0.19)
Trade Dependence$_{ij,t-1}$	3.27 (2.71)	3.12 (3.07)
Total Trade$_{i,t-1}$	-1.38* (0.49)	-1.16* (0.48)
Economic Growth$_i$	-0.04* (0.01)	-0.05* (0.01)
Time since last initiation$_i$	-0.40* (0.05)	-0.39* (0.05)
State Wealth$_{i,t-1}$	0.52* (0.17)	0.53* (0.17)
Demographic Pressure$_i$	0.64* (0.19)	**0.39** **(0.29)**
Level of Democracy$_i$	0.07 (0.04)	**0.01** **(0.17)**
Level of Democracy$_i^2$	-0.005* (0.002)	**-0.01** **(0.01)**
Demographic Pressure$_i$ * *Level of Democracy*$_i$		**0.005** **(0.05)**
Demographic Pressure$_i$ * *Level of Democracy*$_i^2$		**0.001** **(0.002)**
N	57,396	57,396
Chi-square	737.68*	781.61*
Pseudo R^2	0.1830	0.1850

Dependent variable is *Violent Initiation*. Cell entries are logistic estimates with robust standard errors clustered on dyad in parentheses. Each model also includes a cubic spline function with three knots, which are not reported. Statistical significance is indicated as: * $p \leq .05$ (two-tailed).

The danger of not accounting for the possible target of an inter-state initiation can be viewed in Figure G.2. Unlike Figure 6.5 which indicated that the impact of demographic pressure was relatively consistent across regime types, Figure G.2 suggests that the probibility of inter-state conflict is especially high for democracies experiencing demographic pressure. This increasing probability becomes more apparent as demographic pressure meets and exceeds the mean value; however, the difference in probabilities between complete autocracies and consolidated democracies at high demographic pressure is quite startling.



Note: Confidence intervals set at 95%. Compare to Figure 6.4.

Figure G. 1. Impact of Demographic Pressure, Conditioned on Level of Democracy

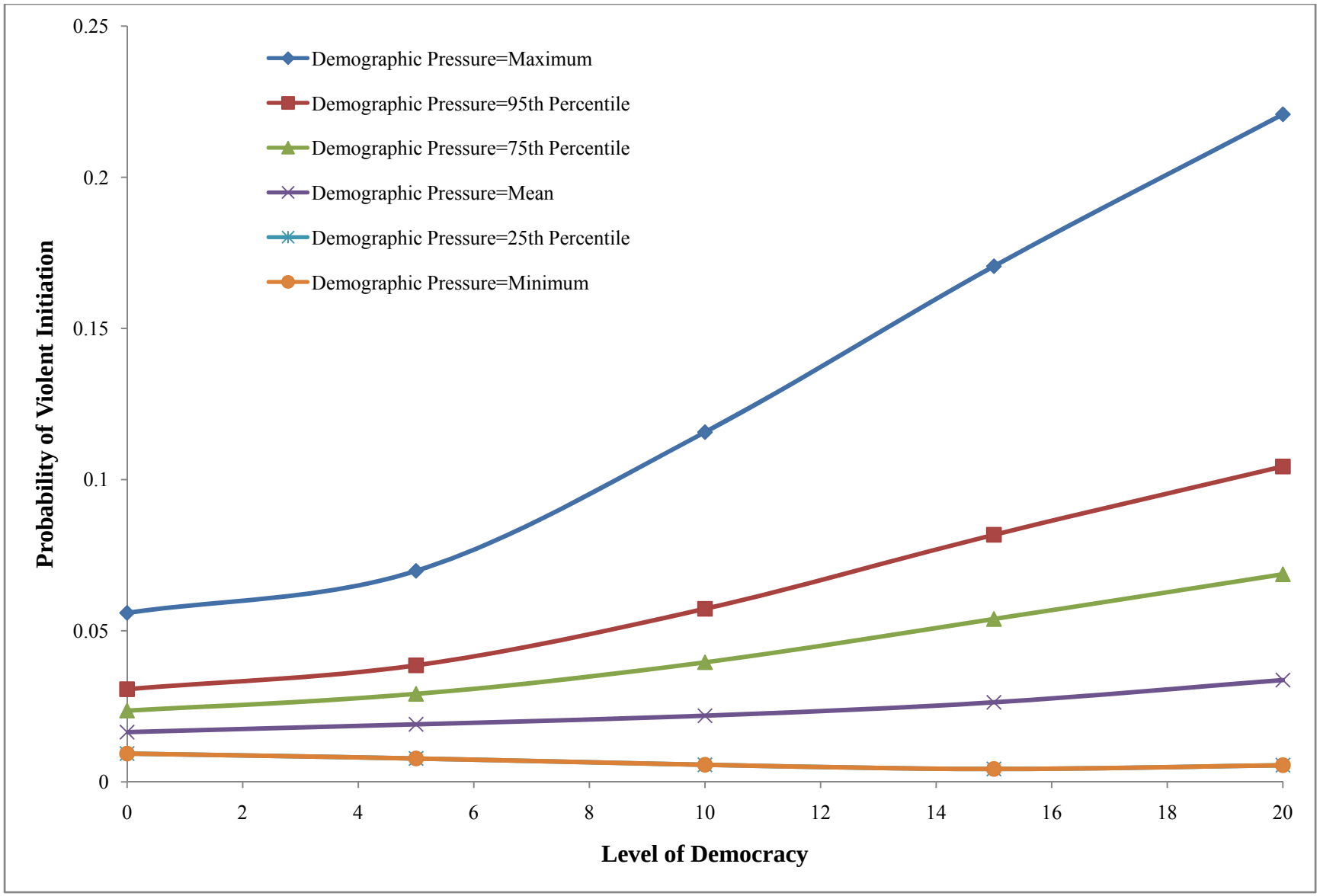


Figure G. 2. Probability of Violent Dispute Initiation for Various Regime Types Without Controlling for Target Level of Democracy

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